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OF THE LAST (1880) EDINBURGH AND LONDON EDITION

OF CHAMBERS'S ENCYCLOPÆDIA,

With Copious Additions by American Editors.

FIFTEEN VOLUMES.

VOLUME IX.

NEW YORK:
AMERICAN BOOK EXCHANGE,
764 BROADWAY,
1881.

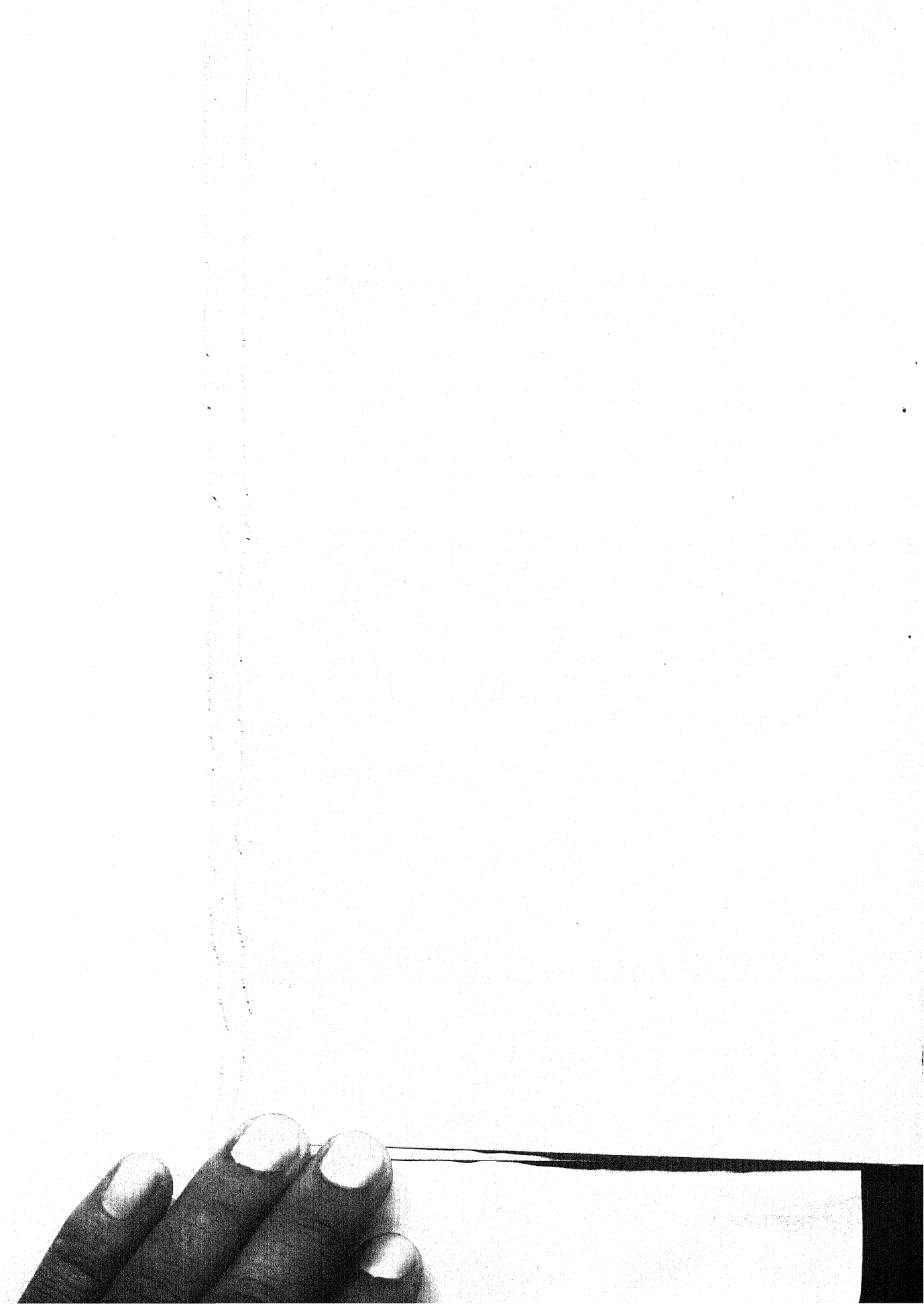
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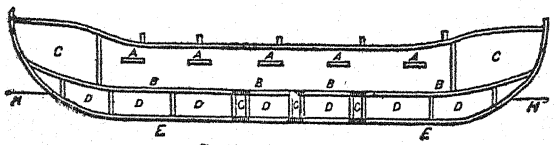
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LIFE-BOAT, a boat adapted to "live" in a stormy sea, with a view to the saving of life from shipwreck. Its qualities must be buoyancy, to avoid foundering when a sea is shipped; strength to escape destruction from the violence of waves, from a rocky beach, or from collision with the wreck; facility in turning; and a power of righting when capsized.

A melancholy wreck at Tynemouth, in Sept., 1789, suggested to the subscribers to the South Shields news-room, who had witnessed the destruction of the crew one by one, that some special construction of boat might be devised for saving life from stranded vessels. They immediately offered a premium for the best form of life-boat; and the first boat built with the express object of saving life was that constructed on this occasion by Mr. Henry Greathead. It was of great strength, having the form of the quarter of a spheroid, with sides protected and rendered buoyant within and without by the superposition of layers of cork. So useful was it in the first twenty-one years after its introduction that 300 lives were saved through its instrumentality in the mouth of the Tyne alone. Mr. Greathead received the gold medals of the society of arts and royal humane society, £1200 from parliament in 1802, and a purse of 100 guineas from Lloyd's, the members of which society also voted £2,000 to encourage the building of life-boats on different parts of the coast. Although various other life-boats were invented from time to time, Greathead's remained the general favorite until about the year 1851, and many of his construction are still to be seen on different points of the coast. They failed, however, occasionally; and several sad mishaps befell the crews of life-boats, especially in the case of one at South Shields, in which twenty pilots perished. Upon this the



Section lengthwise.

duke of Northumberland offered a prize for an improved construction, and numerous designs were submitted, a hundred of the best of which were exhibited in 1851. Mr. James Beeching of Yarmouth obtained the award; but his boat was not considered entirely satisfactory, and Mr. R. Peake, of her majesty's dockyard at Woolwich, was intrusted with the task of producing a life-boat which should combine the best qualities of the different inventions. His efforts were very successful, and the national life-boat institution adopted his model as the standard for the boats they should thereafter establish on the coasts.

Sections of Mr. Peake's life-boat are shown above, one lengthwise through the keel, the other crosswise in the middle. A, A, are the thwarts on which the rowers sit; BB, a water-tight deck, raised sufficiently above the bottom of the boat to be above the level of the sea when the boat is loaded; C, C, are air-tight chambers running along each side, and occupying from 3 to 4 ft. at each end: the buoyancy afforded by these more than suffices to sustain the boat when fully laden, even if filled with water. To diminish the liability to capsize in a heavy sea, the life-boat has great beam (breadth) in proportion to her length, viz., 8 ft. beam to 30 length. In addition, the bottom is almost flat. As in her build it has been found convenient to dispense with cross-pieces, some means are required to preserve the rigidity of the whole structure amid the buffetings of a tempest. To achieve this, and also to serve the purposes of light ballast, Mr. Peake fills the space between the boat's bottom and the water-tight deck (BB) with blocks, tightly wedged together, of cork and light hard wood, D, D. These would form a false bottom, were a rent made in the outer covering, and, by their comparative weight, counteract in some degree the top-heaviness induced by the air-vessels, which are entirely above the water-line (H). This arrangement would be insufficient to maintain the equilibrium of the

boat, however, and especially under sail, so Mr. Peake has added a heavy iron keel (E) of from 4 to 8 cwt., which effectually keeps the boat straight. Some builders object to this iron ballast: the Liverpool and Norfolk boats take out their plugs, and preferably admit water until steadiness is secured; but Mr. Peake has an additional object in view—that of causing the boat to immediately right itself if turned upside down, as the best boats sometimes will be in heavy gales. It will be noticed that the ends of the boat rise above the center 1½ to 2 feet. This, for one thing, facilitates turning, as the pivot on which her weight rests is shortened; for another, if she capsizes and is thrown bottom up, these raised caissons are sufficient to sustain her by their buoyancy. So long, then, as she floats precisely in an inverted state, she will be steady; but the slightest motion to either side—which, of course, in practice ensues instantly—throws the heavy keel off the perpendicular, in which its center of gravity was exactly over the line between bow and stern, and the boat must immediately right itself. There is a covered trough over the keel to contain the tackle, sails, etc., when not in use; in service, it is also useful to receive any water that may penetrate among the cork and wooden chocks beneath the water-tight deck: this leakage is at times considerable when the outer skin of the boat has sustained damage. The trough may be fitted with a small hand-pump, to enable one of the sitters to clear it out when necessary.

Perhaps the most beautiful contrivance in the life-boat is that for discharging the water which she ships. This consists of 6 relieving tubes, G, each 6 in. in diameter, passing through the deck, B, the ballast, D, and the bottom. The tubes, which are near the center of the boat, 3 on each side, have at the bottom a valve opening outwards. As the deck, B, is always above the water-level, any water in the boat necessarily flows out through these tubes, so that if a wave bursts over her, and completely fills the boat, the relieving tubes free her, and she is empty again in a few minutes. The greater the height of water within, the faster will it run out. The advantages of the life-boat may be thus summed up. The air-chambers and the light ballast render sinking impossible; the keel nearly prevents capsizing, and rectifies it, if it does happen; while the relieving tubes effectually clear off any water that finds its way within. With such precautions, the safety of the crew appears almost assured, and, in fact, loss of life in a life-boat is a very rare occurrence.

The boat is kept on a truck—of considerable strength, as the life-boat weighs two tons—close to the beach, and is drawn to the water's edge when required; the crew are trained to their work, and, it need not be added, are among the hardiest of seamen. Ordinary life-boats are rowed by 8 or 12 oars (of the best fir) double banked; but for small stations, where it would be difficult to collect so many men at short notice, smaller boats are made, rowing six oars single banked.

The importance of the life-boat in saving life can scarcely be over-estimated. Hundreds of vessels have their crews rescued through its use every year; and as the national life-boat institution obtains funds, this invention is being gradually extended all round the coast of the United Kingdom, while foreign nations have not been remiss in thus protecting their shores.

The *Royal National Life-boat Institution*, after an unrecognized existence for several years, was formally incorporated in 1824. Its objects are to provide and maintain in efficient working order life-boats of the most perfect description on all parts of the coast; to provide, through the instrumentality of local committees, for their proper management, and the occasional exercise of their crews; to bestow pecuniary rewards on all who risk their lives in saving, or attempting to save, life on the coast, whether by means of its own or other boats, and honorary rewards, in the form of medals, to all who display unwonted heroism in the noble work. It is supported entirely by voluntary contributions. It saves about 900 lives annually, and is therefore eminently worthy of support. In 1875 it expended £36,136 on life-boat establishments, pecuniary rewards (£3,289), etc. The society has now a fleet of 256 life-boats stationed all round our shores. The coxswains of the boats alone are paid at the rate of about £8 a year. The members of the crew are paid for each service performed. From its formation up to the end of 1875, the society was instrumental in saving 23,789 lives, and gave rewards in cash to the extent of £48,000, besides 92 gold and 871 silver medals.

The size of a common life-boat renders it inconvenient for stowage on shipboard. To obviate this, the rev. E. L. Berthon, of Fareham, invented a collapsing boat, which is readily expanded, possesses great strength, and at the same time occupies comparatively little space when out of use. Its sides are connected by various hinges. This boat is extensively employed for ocean steamships.

LIFE-ESTATE, in English law, is an estate or interest in real property for a life. The life may be either that of the owner or of some third party, in which latter case it is called an estate *pur autre vie*. Life-estates in lands are classed among freeholds (q.v.). The tenant for life has certain rights in regard to the uses of the estate. He is entitled to cut wood to repair fences, to burn in the house, etc. He cannot open a mine on the estate, but, if it was already opened, he is entitled to carry it on for his own profit. Life-estates are created by deed, but there are certain estates created by law, as courtesy (q.v.), dower (q.v.), tenancy in tail after possibility of issue extinct. As to Scotland, see LIFE-RENT.

LIFE-GUARDS, the two senior regiments of the mounted portion of the body-guard of the British sovereign and garrison of London. They took their origin in two troops of horse-grenadiers raised respectively in 1693 and 1702: these troops were reduced in 1783, and reformed as regiments of life-guards. Although usually employed about the court and metropolis, the life-guards are not exempt from the liability to foreign service when required, having distinguished themselves in the Peninsula and at Waterloo. The men are all six feet high and upwards, armed with sword and carbine, wear knee-boots, leather breeches, red coats, and steel helmets. They also wear steel cuirasses, the utility of which is considered very doubtful. With this unwieldy armor, they require powerful horses, which are uniformly black. The two regiments comprise 868 men, with 550 horses; their pay and personal allowances amount to about £50,000.

LIFE-INSURANCE. See INSURANCE.

LIFE MORTARS AND ROCKETS. When a life-boat is not at hand, or a raging sea and a shoal coast render its use impracticable, a distressed ship may often receive help from shore, provided the distance be not too great for the throwing of a rope. A small rope may draw a thicker, and that a hawser, and the hawser may sustain a slinging apparatus for bringing the crew on shore. For short distances, capt. Ward's *heaving-stick* has been found useful: it is a piece of stout cane 2 ft. long, loaded at one end with 2 lbs. of lead, and at the other attached to a thin line. It is whirled round vertically 2 or 3 times, and then let go; but it cannot be relied on for more than 50 yards. Kites of various kinds have been employed, but are not found to be certain enough in action. The firing by gunpowder of some kind of missile, with a line or rope attached to it, is the method which has been attended with most success. In 1791 sergt. Bell, of the royal artillery, devised a mode of firing a shot and line from a distressed ship to the shore. It was afterwards found to be more practically useful to fire from the shore to the ship. In 1807 capt. Manby invented his *life-mortar* (see MANBY). His mortar was an ordinary 5½-in. 24-pounder cohorn, fixed at a certain angle in a thick block of wood. The missile discharged from it was a shot with curved barbs, something like the flukes of an anchor, to catch hold of the rigging or bulwarks of a ship. How to fasten the shot to the rope was at first a difficulty: chains were not found to answer; but at length strips of raw-hide were found suitable. To assist in descrying the exact position of a distressed ship on a dark night, in order to aim the mortar-rope correctly, Manby used a chemical composition as a firework, which would shine out in brilliant stars when it had risen to a certain height. A third contrivance of his for replacing the shot by a shell filled with combustibles, in order to produce a light which would render the rope visible to the crew, was not so successful.

Many variations have been made in the line-throwing apparatus. Col. Boxer has recently substituted a *bolt* for the shot, with four holes at the end; fuses thrust into these holes shed a light which marks the passage of the bolt through the air. Trengrove's rocket-apparatus, invented in 1821, consisted of an ordinary 8-oz. sky-rocket (see ROCKET). Certain practical difficulties, however, affected it, and it did not come much into use. In 1832 Dennett's apparatus was invented. It nearly resembled the old sky-rocket, but with an iron case instead of a paper one, and a pole 8 ft. long instead of a mere stick; it weighed 23 lbs., was propelled by 9 lbs. of composition, and had a range of 250 yards. A ship's crew having been saved by the aid of this rocket at Bembridge, in the isle of Wight, the board of customs caused many of the coastguard stations to be supplied with the apparatus in 1834. Carte's apparatus, brought forward in 1842, depended on the use of a Congreve rocket (see ROCKET) instead of an ordinary sky-rocket. It does not appear that this apparatus was ever adopted by the authorities. Mr. Dennett next sought to improve the power of his apparatus, by placing two rockets side by side, attached to the same stick; and it certainly did increase the range to 400 yards; but as the simultaneous and equal action of the rockets could not be always insured, the scheme was abandoned. Col. Delvigne, of the French army, invented a *life-arrow*, to be fired from an ordinary musket. It is a stick of mahogany, shaped something like a billiard-cue; the thicker end presses on the powder; while the thinner end, loaded with lead, is fitted with loops of string; a line or thin rope is attached to the loops, and the thin end of the stick projects beyond the barrel. The jerk, when the arrow or stick is fired, causes the loops to run down the stick to the thick end; this action has an effect like that of a spring, preventing the stick from darting forward so suddenly as to snap the line. The apparatus will send an arrow of 18 oz. to a distance of 80 yards, with a mackerel line attached. Another French contrivance, Tremblay's rocket with a barbed head, was soon adopted for the emperor's yacht; but as it is to be fired from the ship to the shore, it partakes of the same defects as sergt. Bell's original invention.

The most effective apparatus yet invented is col. Boxer's. Finding that Dennett's parallel rockets on one stick do not work well, he succeeded after many trials in a mode of placing two rockets in one tube, one behind the other. The head is of hard wood; there is a wrought-iron case, with a partition between the two rockets. When fired, the foremost rocket carries the case and the attached line to its maximum distance, and the rearmost rocket then gives these a further impetus. The effect is found to be greater than if the two rockets were placed side by side, and also greater than if the quantity of composition for the two rockets were made up into one of larger size. The rocket is

fired from a triangular stand, and is lighted by fuse, port-fire, or percussion-tube; the elevation is determined by a quadrant or some similar instrument.

The lines used with these several projectiles have varied greatly; but the best is found to be Italian hemp, spun loosely. It is very elastic, and when thick enough for the purpose, 500 yards weigh 46 lbs. In Boxer's rocket, the line passes through the tail of the stick, then through the head, where it is tied in a knot, with India-rubber washers or buffers to lessen the jerk. The line is carefully wound on a reel, or coiled in a tub, or faked in a box provided with pins ranged round the interior—to enable the line to run out quickly without kinking or entangling. Dennett's faking box for this purpose is the one now generally adopted.

Life-belts, jackets, and buoys of various kinds are used, made of cork, inflated India-rubber, etc.; but one apparatus now employed in conjunction with the life-rockets is known by the curious name of *petticoat-breeches*, or more simply, *sling life-buoy*. It is not strictly either a belt or a buoy, but a garment in which a man may be slung clear out of the water. When a rocket has been fired, and a line has reached the distressed ship, signals are exchanged between the ship and the shore; a thicker rope is pulled over to the ship by means of the line, and a hawser by means of the rope. When all is stretched taut, by fastening to the masts, etc., articles can be slung and drawn to and fro. The petticoat-breeches, invented by lieut. Kisbee, consists of a circular cork life-buoy forming the top ring of a pair of canvas breeches; one of these is hauled over from the shore to the ship; a man gets into it, his legs protruding below the breeches, and his armpits resting on the buoy; and he is hauled ashore by block-tackle. The crew of a wrecked ship can thus one by one be relieved. To prevent losing the hawser and other apparatus, when the last man has left the ship, an apparatus called a hawser-cutter is used, working *in* the ship, but worked *from* the shore. Other apparatus will be found noticed in LIFE-PRESERVERS.

After the destruction of the *Northfleet* in 1873, off Dungeness, an exhibition was organized at the London tavern, to which the inventors of new life-saving appliances were invited to contribute. Among the apparatus were Hurst's *life-raft*, consisting of a double pontoon, bridged over, stowed outside a ship, and lowered by simply cutting the lashings; Christie's *life-raft*, a large rectangular framework, rendered buoyant by numerous air-tight spaces, some of which are available for stowing water and provisions; and Parratt's *tubular life-raft*, composed of cylindrical air-bags made of painted canvas, supporting a flooring of sail-cloth and netting, and rendered rigid by poles fixed in various directions. Many other novelties were displayed at the London tavern, and also at a similar collection in the annual international exhibition, in the forms of life-boats, rafts, garments, belts, buoys, etc. Since then, nothing new and important has been introduced in connection with life mortars and rockets or their appendages.

LIFE-PRESERVERS, inventions for the preservation of life in cases of fire or shipwreck. The fire life-preservers will be found treated of under FIRE-ESCAPES. The other class includes the various contrivances for preserving the buoyancy of the human body, and for reaching the shore. Of these, the readiest and most effective are empty water-casks, well bunged-up, and with ropes attached to them to hold on by. It has been found that a 36-gal. cask so prepared can support 10 men conveniently, in tolerably smooth water. Cook's and Rodger's patent life-rafts consist of square frames buoyed up by a cask at each corner. Among foreign nations, frames of bamboo, and inflated goat and seal skins, have been long employed as life-preservers; and in China, it is customary for those living on the banks of the canals to tie gourds to their children, to buoy them up in case of their falling into the water. Since the introduction of cork, jackets and belts of that material in immense variety have been patented. It has been calculated that one pound of cork is amply sufficient to support a man of ordinary size and make. A few years ago, on the invention of india-rubber cloth, inflated belts of this material were made, and found to be superior in buoyancy to the cork belt, besides, when emptied of air, being very portable. They are, however, much more liable to damage by being punctured or torn, or to decay by being put away while damp. Some of these defects are remedied by having the interior of the belt divided into several compartments; so that, when one is damaged, the remainder may still suffice. Various forms of inflated mattresses, pillows, etc., have been made on the same principle, and been found very effective; one shown at the great exhibition of 1851 having sustained 96 lbs. for five days without injury. But the favorite life-buoy among sailors is composed of slices of cork neatly and compactly arranged, so as to form a buoyant zone of about 30 or 32 in. in diameter, 6 in width, and 4 in thickness. It consequently contains about 12 lbs. of cork, and is generally covered with painted canvas to add to its strength and protect it from the injurious action of the water. A buoy so constructed can sustain 6 persons, and it is generally furnished with a *life-line* (a cord running round the outside of the buoy and fastened to it at 4 points) to afford a more convenient hold. This life-preserver is found on board all vessels. See LIFE MORTARS AND ROCKETS.

LIFE-RAFTS, structures made to serve the purposes of life-boats when the latter are lacking. They may be made of various materials, such as are at hand. Logs, boards, stools, broken timbers, bound together with ropes or cords, or even the bark of

trees when ropes cannot be found, are susceptible of being formed into rafts which may be managed by resolute and experienced men in the saving of life from a wrecked ship. But apparatus is sometimes provided for the purpose of forming rafts to be used in emergencies. A number of cork life-preservers or inflated bags covered with canvas, and divided into two sections with a space between, may be used. Mr. H. B. Mountain has devised a raft in which a water-proof canvas sack has its edges secured along the centers of two mattresses so as to provide an open chamber between them in which persons may be seated. It has been attempted to construct a vessel in such a way as to have cabins or structures removable, so that they may be floated away in case of wreck, but all such ingenious devices are probably much less useful and manageable than life-boats, which can be as easily provided.

LIFE-RENT, in Scotch law, means a right to use a heritable estate for life, the person enjoying it being called a life-renter. The rights of a life-renter nearly resemble, though they are not identical with, those of a tenant for life in England. See LIFE-ESTATE.

LIFE-ROCKET DEPARTMENT, or, rather, that branch of the marine department of the board of trade which has the management of life-rockets, mortars, lines, buoys, and belts, divides with the national life-boat institution the labors connected with the prevention of shipwreck, and the rescue of shipwrecked persons. This has been the arrangement since 1855. Until that year the life-mortars in use were partly under the control of the admiralty, partly under the board of customs, partly under the institution just named, and partly belonging to private individuals. The merchant shipping act, passed in 1854, and put in force in the following year, placed the whole under a different organization.

To work out properly the rocket and life-saving system, a topographical organization is in the first instance adopted. The coasts of the United Kingdom are classified into 59 coast-guard divisions or wreck-registrars' districts; and the coast-guard inspector of each division or district has control over all the rockets, mortars, buoys, belts, and lines kept at the various seaside stations in his district. There were in 1874 about 300 such stations; some supplied with mortars, some with rockets as well as mortars, but the greater number with rockets only. Most of the mortars are Boxer's improvement on Manby's; and most of the rockets are Boxer's improvement on Dennett's. Boxer's rockets, found more effective than mortars, are made at the royal laboratory at Woolwich, and are supplied by the war department to the stations, on requisition from the board of trade; as are likewise mortar-shot and shells, fuses, portfires, signal-lights, gunpowder, etc. At each station is kept a cart, expressly made to contain all the requisites for the rocket apparatus, ready packed. Eighteen rockets are supplied with each apparatus; and a new supply is obtained before these are exhausted. Between 1874 and 1880, the system has extended year by year in the number of stations and of men; but while details of organization have changed, no new principle has been introduced. Simpler apparatus, consisting of life-belts and life-lines, is kept at a much greater number of stations. The system is worked by the coast-guard, the men being paid for periodical drilling, and for regular service. Special services are rewarded with gifts of money, medals, etc.

LIFE SAVING SERVICE. The first instance on record of a combined public effort in the direction of life-saving is that of the national life-boat association, in England, founded in 1824 under the name of the royal national association for the preservation of life from shipwreck. But as early as 1785, when the first patent was granted for a life-boat, the subject was attracting general attention; and a second boat, invented four years later, is said to have saved nearly 300 lives from vessels wrecked near the mouth of the Tynemouth haven, during the following fifteen years. The life-boat association was established "to grant funds for making life-boats, boat-houses, and life-buoys; to assist in training boatmen and coast-guardsmen to aid ships in distress; to interchange the fullest information, with corporate bodies and local committees, concerning life-saving appliances; and to reward by money, medals, and votes of thanks, those who might render aid to ships in distress, or to persons escaping from such ships." Between 1824 and 1877 this institution saved 25,435 lives: in 1876 it had 2,541 life-boats. But this association had been already indirectly preceded in the United States in the same direction, through the application of the machinery of the Massachusetts humane society to live-saving, as early as 1786. This organization, formed for general benevolent purposes, and incorporated 1791, devoted attention to the dangers of the coast of Massachusetts and to the succor of shipwrecked seamen and others, by erecting huts for their shelter on specially exposed portions, the first of these having been set up on Lovell's island, near Boston. The first life-boat station of the society was established at Cohasset in 1807, and was followed by the erection of a number of others. This movement attracted the attention of the government, which in 1847 appropriated $5,000 "for furnishing the light-houses on the Atlantic coast with the means of rendering assistance to shipwrecked mariners." In 1855 a second appropriation, of $10,000, was made by congress; in 1857, one of $10,000; and in 1870, one of $15,000. This society is still in active service, having 78 stations. Other societies, designed to aid in the protection and safety of life, were organized from time to time in different localities, but accomplished little or nothing, excepting the live-saving benevolent association of New York, founded in 1849, and still in operation, but whose work has generally been in other directions from

that under consideration. In the meantime the U. S. government had frequently had the life-saving question under consideration. As early as 1807 an effort was made to organize a coast survey, but it was unsuccessful; and it was not until 1832 that this most important department of the government was finally established; being followed by the organization of the lake survey in the hands of the engineer corps of the U. S. army. In 1848 congress appropriated $10,000 to provide surf-boats and organize a life-saving service for the coast of New Jersey. With this sum eight buildings, suitably appointed, were erected; and when, in 1849, congress appropriated $20,000 for the general purpose, a similar number of buildings was erected on the coast of Long island, and six additional ones on that of New Jersey. In 1850, $20,000 more, appropriated by congress, enabled the establishment of stations at other points along the coast of the Atlantic and the gulf, provided with life-boats and other material. In 1852 the reformation of the light-house system gave a great impetus to the movement towards a suitable life-saving service; a system which now operates 1336 lights on the sea-coast and inland shores, besides fog-signals, buoys, and other machinery. In the two years following 1852 congress appropriated $42,500 to the purposes of life-saving, and the service, while being continued along the sea-coast, was also extended to the great lakes. In 1854 a law was passed by congress which increased the efficiency of this service, and from that time slight improvements continued to be made. But it was not until 1871 that the present system may be said to have been fairly organized. On April 20 in that year, congress appropriated $200,000, and the service was reorganized, under the general direction of Mr. Sumner I. Kimball, the present (1881) superintendent. New stations were appointed and provided; the efficiency of the *personnel* of the service was improved; and a suitable commission decided upon the selection of appliances for life-saving, which were adopted and procured. In 1873 the limits of this service were broadened, the sum of $100,000 being appropriated by congress for this purpose. Finally, by the act of June 20, 1874, congress perfected its work. This act authorized the arrangement of the life-saving stations into complete stations, life-boat stations, and houses of refuge; created new districts with salaried officials; established a system of honors in the bestowal of medals; and arranged for the tabular collection of statistics displaying the efficiency of the service, and directing attention to places requiring protection at its hands. The storm-signal department of the signal service was now connected with the life-saving stations, through the use of an appropriation by congress of $30,000 specifically for that purpose. The record of this season showed how admirably the service had been adapted to the purpose for which it had been organized: 1165 lives were saved on the three coasts covered by its operations, while only two were lost. The years following were marked by constant and marked improvement in the scope and the working of the service. A valuable code of signals to enable vessels in danger to communicate with the stations was adopted in 1878; a line of telegraph between capes Henry and Hatteras, and in the vicinity of the stations on the North Carolina coast, connecting with the head-quarters of the signal service in Washington, was applied to the uses of the life-saving service; and preparations were made which resulted in the adaptation of a system of telephones to the same purpose at twelve of the stations on that coast. The act of congress of June 18, 1878, organized the life-saving service into a distinct department; it having been previously associated with the revenue marine. This act also extended the annual term of service of the crews, doubled the pay of station-keepers, and authorized compensation for the voluntary life-boat service which had been established on the lakes.—The scene of the labors of the life-saving service covered, in 1871–72, the coast of Long island and New Jersey; the seasons of 1872–74, that of cape Cod in addition to these; the season of 1874–75, the coasts of New England, Long island, New Jersey, and the coast from cape Henry to cape Hatteras; season of 1875–76, coasts of New England, Long island, New Jersey, coast from cape Henlopen to cape Charles, and that from cape Henry to cape Hatteras; season of 1876–77, all the foregoing, with the addition of Florida and the lake coast; season of 1877–78, the coast of Maine, New Hampshire, Massachusetts, Rhode island and Long island, New Jersey, cape Henlopen to cape Charles, cape Henry to cape Hatteras, eastern coast of Florida, lake coast, and Pacific coast; 1878–79, same as the last. Following is a general summary of disasters which have occurred within the scope of live-saving operations from Nov. 1, 1871 (date of introduction of present system), to close of fiscal year ending June 30, 1879:

Total number of disasters	797
Total value of vessels	$10,722,733
Total value of cargoes	5,923,294
Total value of property saved	9,510,408
Total value of property lost	7,099,619
Total number of persons on vessels	8,392
Total number of persons saved	8,030
Total number of lives lost	362
Total number of persons sheltered	1,753
Total number of day's shelter afforded	4,790

Of the number of lives lost, 183 were at the disasters to the U. S. steamer *Huron*, Nov. 24, 1877, and that of the steamer *Metropolis* Jan. 29, 1878.—At the close of the fiscal year

ending June 30, 1878, there were 12 life-saving districts, covering 173 stations; 981 surfmen employed; net expenditures for the year $363,674.72; balance of appropriations unexpended, $30,017.28. The *personnel* of the service included one general superintendent, Sumner I. Kimball; one assistant general superintendent, William D. O'Connor; one inspector of life-saving stations, capt. James H. Merryman; two superintendents of construction of life-saving stations, capt. John McGowan, capt. James H. Merryman; 12 assistant inspectors, 2 lieutenants U. S. revenue marine on special duty, 12 district superintendents, 1 assistant district superintendent.

LIFTS, ropes on shipboard for raising or lowering and maintaining in position the yards. They pass from the deck over pulleys at the mast-head, and thence to near the extremities of the yard. The lift bears the designation of the yard to which it is attached, as *fore-lift*, *maintop-gallant-lift*, etc. See RIGGING.

LIGAMENTS are cords, bands, or membranous expansions of white fibrous tissue, which play an extremely important part in the mechanism of joints, seeing that they pass in fixed directions from one bone to another, and serve to limit some movements of a joint, while they freely allow others.

Todd and Bowman, in their *Physiological Anatomy*, arrange ligaments in three classes: 1. *Funicular*, rounded cords, such as the external lateral ligament of the knee-joint, the perpendicular ligament of the ankle-joint, etc.; 2. *Fascicular*, flattened bands, more or less expanded, such as the lateral ligaments of the elbow-joint, and the great majority of ligaments in the body; 3. *Capsular*, which are barrel-shaped expansions attached by their two ends to the two bones entering into the formation of the joint, which they completely but loosely invest: they constitute one of the chief characters of the ball-and-socket joint, and occur in the shoulder and hip joints. See JOINTS.

LIGAMENTS (*ante*). See SKELETON.

LIGAN. See FLOTSAM, *ante*.

LIGATU'RA, an Italian term in music, meaning binding, frequently marked by a slur, thus ⁀, which is placed over certain notes for the purpose of showing that they are to be blended together; if in vocal music, that they are to be sung with one breath; also used in instrumental music, to mark the phrasing.

LIGATURE, the term applied, in surgery, to the thread tied round a blood-vessel to stop bleeding. The ligatures most commonly used consist of strong hempen or silk threads; but catgut, horsehair, etc., have been employed by some surgeons. A ligature should be tied round an artery with sufficient tightness to cut through its middle and internal walls. Although the operation of tying arteries was clearly known to Rufus of Ephesus, who flourished in the time of Trajan, it subsequently fell into desuetude, till it was rediscovered by Ambrose Paré, in the 16th century.

LIGATURE (*ante*). The ligature had been partially applied by the Roman surgeons, but it fell into disuse during the dark ages, and was not revived till 1536–37, when the celebrated Ambroise Paré (q.v.) introduced it while in Italy with the army of marshal René de Mont-Jean. This example did not, however, suffice to make the practice general, and it was long before it was introduced into England, where, as late as 1761, it needed advocates in cases of wounded arteries. Thirty years after this, John Hunter employed the ligature in the treatment of aneurism in a new way, viz., by tying the artery at a considerable distance from the aneurismal sack, and where it was in a healthy condition. But this great improvement was coldly received.

Ligatures are applied chiefly: 1. For removing tumors of various kinds, such as hemorrhoids of the rectum, and fibrous, fleshy, and erectile tumors in various parts; 2. For arresting hemorrhage in arteries, either at the time of an amputation, or any operation in which an artery is divided, or when an artery is wounded by accident; 3. For arresting the flow of blood, to diminish either the *supply* of blood going to a part, or the *flow* of blood in an aneurismal or otherwise weakened artery.

Ligatures are of various materials, as linen thread or twine, silk, animal membrane, such as the gut of the silk-worm, deer-skin, catgut, gold, silver, platinum, or lead wire. The principles indicating the use of these various materials vary with circumstances. It is often desirable, instead of keeping a wound open, to close it immediately, in which case the ligature must be of such material that it can be left in the wound and allow of the flesh to heal over it. Linen thread or silk will not then answer, because of the irritation they would create. Fine gold and silver wire has been successfully used in such cases, the ends of the ligature being cut off short. After a while the small piece of ligature will make its way to the surface, after having fulfilled its office, or it may become covered with a cellular capsule. The older surgeons used animal membranes, but with indifferent success. Wardrop used the gut of the silk-worm, and catgut was employed by sir Astley Cooper, with a view to absorption of the ligature. In one patient of Cooper's, 80 years of age, the wound healed in four days; another in twenty, and it was supposed that the material was absorbed. Other surgeons who attempted to imitate the process failed; the catgut was often found too weak, or wanting in firmness; and sir Astley himself, after having some unsuccessful cases, abandoned the use of this material and returned to that of the ordinary hempen thread. The wire ligature now so much used, and which in many modern operations is absolutely necessary for suc-

cess, is an American invention. It originated with Drs. Physick and Levert, who performed several operations with threads of gold, silver, platinum, and lead. When the ends of the ligature were cut off close to the vessels they usually became imbedded in a cellular capsule, and did not occasion irritation. But this practice also fell into disuse, to be revived in recent times with certain modifications which render it almost one of the necessary adjuncts of modern surgery. The use of the catgut ligature has also recently been revived with the very important improvement of treating it with a solution of carbolic acid.

The immediate effects on an artery of a ligature applied with sufficient force are the division of the internal and middle coats and the constriction of the outer one. See ARTERY, *ante*. An examination of the vessel a few days after will reveal the formation of a pyramidal coagulum, composed of plastic matter at its base and a fibrinous clot at its apex. The vessel at this point will also be surrounded by coagulable lymph. At the expiration of two or three months the end of the artery will be converted into a fibro-cellular cord as far up as the first branch above the ligature.

The principles involved in the application of ligatures to wounded arteries may be briefly stated in two axioms: 1. Cut directly down on the wounded part, and tie the vessel there; 2. Apply the ligature to both ends of the wounded vessel if it be divided, or, if it be only punctured, to both distal and proximal sides of the puncture; or, in other words, in either case tie the artery in two places. The principles are: if we wish to get at both ends of the vessel conveniently, we should cut directly down to the point of injury; we tie both ends of the divided vessel, or on both sides of the wound in it, because if the proximal side (that towards the heart) alone is tied, vascular connections which may exist between the distal portion of the artery and other vessels may cause recurrent hemorrhage. If it does not take place soon after the application in the form of arterial blood, venous blood will be likely to make its appearance in the course of two or three days.

At first ligatures were applied to arteries, in operations for aneurism, near the sack, and on the proximal side (that nearest the heart). The vessel so near the aneurism rarely being healthy, generally soon gave way, and the operation proved fatal. John Hunter, as above mentioned, made the improvement of tying at a distance from the tumor, and also on the proximal side, and that is still the most favorable position; but Brasdor afterwards conceived the idea of tying on the distal side, because the flow of blood may be arrested in this way, and consolidation effected in the usual way by the laminated deposit of fibrine. The proximal operation is, however, preferable when anatomical difficulties do not prevent or greatly interfere. The immediate object of applying a ligature for aneurism is to cause consolidation in the parts, thereby producing a condition which will prevent the rupture of the vessel by the heart's action. This consolidation it produces by producing coagulation of blood within the vessel, and a deposit of plastic lymph around it. In successful cases, after consolidation and formation of tissue have advanced sufficiently, the tissues give way which are included in the ligature, and this may be easily removed. The success of the operation depends upon the re-establishment of the circulation in those parts which are supplied by that portion of the vessel which is severed from its connection with the heart. This is effected by nature in establishing anastomosing circulation with collateral branches. The bleeding which may result after the ligature of an artery is called secondary hemorrhage, and may arise from the giving way of the coats of the vessel, because it may not have been properly tied, or because the condition of the patient is not such as to allow of natural coagulation of the blood.

The great operations in arterial ligature are the tying of the subclavian, innominate, carotid, and iliac arteries. See CIRCULATION, *ante*. The axillary, brachial, femoral, and smaller arteries of the limbs are frequently tied for various reasons; but sometimes success is rendered difficult, even in these minor operations, from liability to gangrene of the limb, in consequence of the deprivation of circulation; and the operation is justified where an aneurism has burst or a ligature of an already tied artery has given way. Life is sometimes prolonged for many hours and even several days, which, under some circumstances, is a matter of great importance. The ligation of arteries often demands the greatest dexterity, skill, and surgical knowledge. Tissues which lie at considerable depths require to be divided by the knife; much of the work has to be done without the aid of the sight.

The abdominal aorta has been tied in seven instances. The first operation was performed by the great English surgeon, sir Astley Cooper, in 1817, the patient surviving 48 hours. The next was by James of Exeter, in 1829, the patient living only a few hours afterwards. Murray, at the cape of Good Hope, in 1834, performed the next operation, which terminated fatally in 24 hours. Monteiro of Rio Janeiro, in 1842, had the most remarkable prolongation of life under this operation, the patient living 10 days. South of London performed the fifth operation in 1856, with 43 hours' lease of life. McGuire of Richmond, U. S. A., performed the sixth operation in 1868, the patient surviving 12 hours. Stokes of Dublin tied the artery in the seventh instance in 1869, with a fatal issue in 13 hours.

The common iliac artery, according to statistics of Dr. Stephen Smith of New York, has been ligated 40 times, with 10 recoveries. Of 14 cases in which this vessel

was tied for hemorrhage, 13 proved fatal. The majority of the recoveries took place after ligature for aneurism, which constituted about one-half of the cases. The first time a ligature was ever placed around this artery in the living subject was by Dr. William Gibson of Philadelphia, in 1812, in a case of gun-shot wound. The patient died on the 13th day of peritonitis and secondary hemorrhage. It was tied in 1827 by Dr. Valentine Mott, with a successful result. The operation lasted less than one hour. It was performed on Mar. 15, and the ligature was removed on April 3 following. On May 20 the patient made a journey of 25 miles. *The internal iliac artery* was ligatured for the first time in 1812 by Stevens of St. Croix, since which it has been tied 19 times, in 6 cases with success—viz., by Arndt, Dr. White of Hudson, N. Y. (on a tailor 60 years old), Valentine Mott, Syme, Morton, and Gallozzi. *The external iliac artery* was first tied by the celebrated Dr. Abernethy of London, in 1796, in a case of femoral aneurism (Power). During the following 50 years the operation was performed in 100 recorded cases for inguinal aneurism (Norris), with a result of 73 cures and 27 deaths. In one remarkable case both external iliacs were tied, with a successful result, by Tait (Erichsen). In 1814 sir Astley Cooper had performed the operation seven times, with success in four cases. In 1860 it had been tied for aneurism of the femoral artery 43 times (Power).

Ligature of the innominata, or brachio-cephalic artery.—From a table in an essay awarded the second prize by the American medical association in 1878 to Dr. John A. Wyeth of the university of Louisville, Ky., there are recorded 16 cases of ligature of this artery, the largest of the branches of the aorta, and which divides into the right subclavian and right common carotid. One of these operations was attended with success, that by Dr. A. W. Smyth of New Orleans, in 1864, in a case of aneurism of the subclavian artery. The following note is taken from the table: "Aneurism resulted from violent stretching of the arm; three months later innominate and carotid were tied simultaneously; did well until the 14th day, when hemorrhage (16 oz.) occurred, which was controlled by compress; 15th and 16th days, continued slight hemorrhage; 17th day, wound was filled with small shot; 51st day, terrible hemorrhage; 54th day, vertebral artery tied; 55th day, shot removed from wound; patient continued to do well, and recovered." The man died 10 years afterwards of hemorrhage from the original sack of the aneurism. The first ligation of this artery was by Valentine Mott, in 1818, and marked an era in surgery. The patient survived till the 26th day. Four years later Von Graefe of Berlin performed the operation, and the patient lived till the 67th day.

Ligature of the subclavian artery.—In a report made to the American medical association in 1867 by Drs. Willard Parker, George W. Norris, J. H. Armsby, and William H. Mussey, there are tabulated 157 well-authenticated cases. The first operation was performed by Keate, in 1800, for traumatic axillary aneurism, four months after the injury. The patient recovered. The next operation was by Ramsden, in 1809, also for axillary aneurism. The patient died on the fifth day. Four other fatal operations followed, till, in 1815, Chamberlayne was successful. The eighth case was by Dr. Wright Post of New York, in 1817, which also terminated favorably, the patient recovering. The ninth and tenth cases were by the celebrated French surgeon, Dupuytren, both in 1819, one being successful and the other fatal. These early and pioneer operations are surrounded with great interest. They were careful steps in the art of surgery, taken by great men. The second American operation for ligature of the subclavian artery was by Valentine Mott, in 1830, for axillary aneurism, and was successful. Dr. Mott's second case, in 1831, was fatal on the 18th day. The first distal ligature of the subclavian artery was by Wardrop, an English surgeon, in 1827, for aneurism of the innominata. This distal operation on arteries was conceived by Brasdor, but first carried out by Deschamps. See BRASDOR'S OPERATION, *ante*. The next operation on the distal side of the aneurism was performed by Dupuytren, in 1829, but did not result in recovery, the patient dying of exhaustion on the 7th day. There were 10 distal cases, 8 of which died. The two successful ones were by Wardrop and Heath. Between 1831 and 1844, not inclusive, ligature of the subclavian artery was performed 41 times, with 16 favorable and 25 unfavorable results. Dr. Mott's third operation for ligature of the subclavian was in 1838, and resulted in recovery. Drs. John C. Warren of Boston, Valentine Mott and A. C. Post of New York, each tied the artery with successful results in 1844, all of the patients recovering. Dr. Mott's fifth case, in 1850, was also successful, making a record of five cases of ligature of the subclavian artery, two being upon the left, the most difficult side, with only one fatal result. Dr. Willard Parker has also tied the subclavian artery five times, with but two fatal results, in one of which the patient survived till the 42d day. Of the whole 157 cases, 79 were successful and 78 fatal. The committee reported 39 additional cases, with 28 fatal results. They also remark that the subclavian artery, in its first division, has been tied 13 times without a single recovery; in its second division, 9 times, with 4 deaths; and in its third division, 174 times, with 89 deaths.

In the essay of Dr. Wyeth, above quoted, there is a tabulated collection of 286 cases of ligature of the subclavian, which he comprises in three sections: those in which the ligature was applied to the first division of the artery; those in which it was applied in the middle part of its course; and those in which the third division was the seat of operation. This report agrees with the preceding in regard to the 13 cases of

ligature in the first division of the vessel. One of these cases, that of Rossi, in 1844, possesses uncommon interest, from the fact that the autopsy showed that the only artery going to the brain which was not obliterated, and therefore capable of carrying blood, was the left vertebral, and yet the patient survived six days, dying of cerebral anæmia. In its second division, the subclavian has been ligated 13 times, with four cures, the first by Dupuytren in 1819; the second by Nichols of Norwich, England, in 1832; the third by J. C. Warren of Boston in 1844; and the fourth by T. G. Morton of Philadelphia in 1866. The subclavian has been tied in its third division, that next the axilla, in 254 cases. The first was Ramsden's case in 1809. Recovery followed in 120 cases, or nearly 50 per cent.

Ligation of the common carotid artery.—Dr. Wyeth, in an essay on the surgical anatomy and history of the common, external, and internal carotid arteries, and which was awarded the first prize by the American medical association in 1878, reports 794 cases of ligature of the common carotid artery, 18 of the internal, and 91 of the external carotid. These are collected from all parts of the world, and embrace many in military surgery furnished during the late American and European wars, the records of which, until recently, have not been accessible. The common carotid artery was first tied by Abernethy in 1803, the patient surviving 30 hours. The operation was performed six times by Dr. Gurdon Buck of New York between the years 1839 and 1857. All recovered from the operation but one; and three were cured. Five operations were performed by Dr. Detmold of New York, with four recoveries, two cures, and one checking of malignant growth for several months. Dr. Frank H. Hamilton has tied the common carotid 11 times, with 8 recoveries, one cure, and one improvement. The case of cure was for aneurism. Most of the other cases were of malignant disease, in which only temporary relief was expected. Three cases were by Dr. J. C. Hutchison of Brooklyn, two of which were cured. One of these was a wound, and the other a case of severe neuralgia, for which many teeth and portions of the alveolar process had been removed. The fatal case was one of aneurism of the innominate artery, and the patient survived till the 41st day. Five operations were by Von Langenbeck, with two recoveries, including one cure. Four were by Liston, with one temporary recovery. Three were by Dr. George McClellan of Philadelphia, one for erectile tumor of orbit, one for erectile tumor of cheek, and one for vascular fungus of the dura-mater. All were cured. There are 31 cases of ligature of the common carotid given in Dr. Wyeth's table, performed by Dr. Valentine Mott, with 26 recoveries, including 9 cures and 6 improvements. Dr. A. B. Mott, son of Valentine, has performed the operation 11 times, with 10 recoveries, including 7 cures. Nunneley has tied the artery six times for aneurism of the orbit, with five recoveries, including two cures, and one decided improvement. There are 13 cases by Dr. Willard Parker. The first, in 1848, was one of epilepsy. The patient had had a portion of skull removed by the trephine, with temporary improvement; but, the attacks recurring, the carotid was tied. The patient died of some other affection 27 years after. Of the other 12 cases, 10 recovered, including 3 cured, and 3 benefited. In four there was no benefit, but they were cases of malignant disease, which demanded interference. Pirigoff has tied the artery 12 times, with 6 recoveries, including 1 cure, but they were difficult cases; three for aneurism of the innominata, others for shot-wounds and tumors. Preston, in India, tied the artery six times, with recovery in all. One was for epilepsy of 5 years' standing. There was no return of the attack for 5 months, and much improvement of the general health. Dr. Sands of New York has ligated the artery 8 times, with 5 recoveries, including 2 cures, one of which was in an operation for the removal of the lower jaw-bone. Syme has tied the artery 6 times, with 4 cures. Dr. John C. Warren of Boston tied the artery 8 times, with 8 recoveries, including 3 cures. The first operation was in 1827, for aneurism of 4 years' standing, and was successful. Dr. James R. Wood of New York has tied the artery 9 times, with 6 recoveries, including 2 cures and 2 improvements. The other cases were of a malignant nature, and incurable. Of 27 cases tabulated by Erichsen of ligature of both right and left common carotids, 19 recovered. There was an interval between the two operations of a few months; in one case of a year; and in one case of 38 years; the right carotid having been tied by Dupuytren in 1819, the left by Robert in 1857, the latter operation being soon followed by death.

In regard to the effects upon the brain of ligation of the carotids, it may be remarked that ligature of one carotid causes cerebral disturbance in more than one-fourth of the cases, and of these more than one-half are fatal. The tying of both carotids, with an interval of several days or weeks, appears not to cause more cerebral disturbance than when but one is tied. The cerebral symptoms caused by ligature of one or both carotids sometimes depend upon a diminished supply of blood, and consist of convulsive movements, syncope, and paralysis. In other cases there will be increased pressure upon the brain, followed by drowsiness, stupor, coma, and apoplexy. Inflammation is also one of the effects, usually coming on in a few hours after the operation. The lungs are also frequently affected after ligation of the carotids, as has been specially pointed out by Jobert and Miller, becoming congested, with a tendency to a low form of inflammation, in consequence of deficient innervation.

LIGHT is the subject of the science of optics (q.v.). We here just notice its principal phenomena, and the hypotheses advanced to explain them. Every one knows that light

diverges from a luminous center in all directions, and that its transmission in any direction is *straight*. It travels with great velocity, which has been ascertained, by observations on the eclipses of Jupiter's satellites and other means, to be 186,000 miles per second. Shadows (q.v.) are a result of its straight transmission; and it follows from its diverging in all directions from a luminous center that its intensity diminishes inversely as the square of the distance from the center. When it falls on the surfaces of bodies, it is reflected from them regularly or irregularly, totally or partially, or is partly or wholly transmitted or refracted through them. The phenomena of the reflection and of the refraction of light are treated of respectively under the heads catoptrics (q.v.) and dioptrics (q.v.). The facts of observation on which catoptrics is founded are two: 1. In the reflection of light, the incident ray, the normal to the surface, and the reflected ray are in one plane; 2. The angle of reflection is equal to the angle of incidence. Similar to these are the physical laws on which dioptrics is founded. When a ray of homogeneous light is incident on a refracting surface, 1. The incident and refracted ray lie in the same plane as the normal at the point of incidence, and on opposite sides of it; 2. The sine of the angle of incidence, whatever that angle may be, bears to the sine of the angle of refraction a ratio dependent only on the nature of the media between which the refraction takes place, and on the nature of the light. In stating these laws, we have hinted at light being of different kinds. At one time it was not supposed that color had anything to do with light; now, there is no serious dispute but that there are lights of different colors (see CHROMATICS and SPECTRUM), with different properties, though obeying the same general laws. Among the most striking phenomena of light are those treated of under the head Polarization (q.v.). Next to these in interest are the phenomena of double refraction. See REFRACTION, DOUBLE. For an account of the chief chemical properties of light, see PHOTOGRAPHY and SPECTRUM. See also for phenomena not noticed above, the articles ABERRATION, DIFFRACTION, DISPERSION, INTERFERENCE.

Two hypotheses have been advanced to explain the different phenomena of light, viz., the theory of *emission*, or the corpuscular theory, and the theory of *vibration*, or the undulatory theory. According to the former, light is an attenuated imponderable substance, whose colors depend on the velocity of its transmission. It regards reflection as analagous to the rebounding of elastic bodies; while, to explain refraction, it assumes that there are interstices in transparent bodies, to allow of the passage of the particles of light, and that these particles are attracted by the molecules of bodies—their attraction combining with the velocity of the particles of light to cause them to deviate in their course. The undulatory theory assumes that light is propagated by the vibrations of an imponderable matter termed ether (q.v.). On this view light is somewhat similar to sound (see INTERFERENCE). Newton was the author of the former theory, and Huygens may be regarded as the author of the latter. The theories were long rivals, but now no doubt remains that the theory of undulations has triumphed over the other. Its soundness may be said to rest on similar evidence to that which we have for the theory of gravitation: it had not only satisfactorily accounted for all the phenomena of light, but it has been the means of discovering *new* phenomena. In fact, it has supplied the philosopher with the power of prescience in regard to its subject. Those who wish to study the theory may advantageously consult its popular exposition by Young (*Lectures on Natural Philosophy*, London, 1845), and Lloyd's *Wave Theory of Light* (Dublin, 1856). The mathematical theory is very fully investigated in Airy's *Mathematical Tracts*.

LIGHT. In point of law, the right to light is one of the rights incident to the ownership of land and houses. When it is claimed in such a way as to interfere with a neighbor's absolute rights, it is called in England and Ireland an easement (q.v.), and in Scotland a servitude (q.v.). In England and Ireland the right to light, as between neighbors, is qualified in this way, and forms a subject of frequent dispute in towns and populous places. If A build a house on the edge of his ground with windows looking into B's field or garden which is adjacent, B may next day, or any time within 20 years, run up a house or screen close to A's windows, and darken them all, for one has as good a right to build on his own land as the other. But if B allow A's house to stand 20 years without building, B is forever after prevented from building on his own land so as to darken A's lights, for A then acquires a prescriptive right to an easement over B's lands. In the Roman law a person was entitled not only to a servitude of light, but also of prospect; but in this country the right of prospect, or of having a fine view, is not recognized by the law, except so far that the lights, after 20 years, must not be sensibly darkened. In Scotland a servitude of light may exist in like manner, but it cannot be constituted except by special grant; whereas in England, if nothing is said, the right is acquired by prescription, or mere lapse of time. In Scotland a neighbor, B, may, after 20 years, or any distance of time, build on his own land, and darken A's windows, provided he do not act wantonly, emulously, or so as to cause a nuisance.

LIGHT (*ante*). Among the latest conclusions with regard to the velocity of light are those which are published in the *Annales de l'Observatoire de Paris*, vol. xiii., being an account by M. Cornu of the experiments made between the observatory of Paris and the tower of Montlhéry. The result of these experiments gave, for the velocity of

light, 300,400 kilometers per second. Foucault's experiments, made in 1862, placed it at 298,000 kilometers, or 185,000 miles; and the investigations made at the naval academy, Annapolis, 1879, gave a mean between these two conclusions—186,305 miles, or 299,951 kilometers.

LIGHT (*ante*). See UNDULATORY THEORY OF LIGHT, *ante*.

LIGHT, ABERRATION OF. See ABERRATION OF LIGHT, *ante*.

LIGHT, ZODIACAL. See ZODIACAL LIGHT, *ante*.

LIGHTER, a large flat-bottomed barge or boat, usually propelled or guided by two heavy oars, and used for conveying merchandise, coals, etc., between ships and portions of the shore they cannot reach by reason of their draught.

LIGHTFOOT, JOHN, one of the earlier Hebrew scholars of England, was b. in 1602 at Stoke-upon-Trent, in Staffordshire. He studied at Christ's college, Cambridge, and, after entering into orders, became chaplain to sir Rowland Cotton, who, being himself a good Hebrew scholar, inspired Lightfoot with a desire to become one also. In 1627 appeared his *Erubhim, or Miscellanies Christian and Judaical*, which were dedicated to sir Rowland, who, in 1631, presented him to the rectory of Ashley in Staffordshire. Subsequently, he removed to London, that he might have better opportunities for the prosecution of his favorite study; and in 1642 he was chosen minister of St. Bartholomew's, to the parishioners of which he dedicated his *Handful of Gleanings out of the Book of Exodus* (London, 1643). His most important work is *Horæ Hebraicæ et Talmudicæ*, etc. (Cambridge, 1648), recently re-edited by R. Gandell (4 vols., Oxford, 1859). Lightfoot was one of the assembly of divines who met at Westminster in 1643, and in the debates that took place there, betrayed a decided predilection for the Presbyterian form of church government. In the same year he was chosen master of Catharine hall, Cambridge, and in 1655 vice-chancellor of the university. At the restoration he complied with the terms of the act of uniformity. He died at Ely, Dec. 6, 1675.

LIGHTFOOT, The Rev. JOSEPH BARBER, D.D., bishop of Durham, a distinguished English scholar and theologian. Born at Liverpool in 1828, he was educated at Cambridge, obtained numerous distinctions there, and in 1857 became a tutor of Trinity. In 1861 he was made professor of divinity; in 1871, canon of St. Paul's; and in 1879, bishop of Durham. His best known works are revised texts, with introduction and notes, of St. Paul's epistles to the Galatians (4th ed. 1874), Philippians (3d ed. 1873), and Colossians (1875), and of Clement's epistles to the Corinthians. He has also written on the Gnostic heresies and on the canon of Scripture.

LIGHT-HOUSE, a building on some conspicuous point of the sea-shore, island or rock, from which a light is exhibited at night as a guide to mariners. The light-houses of the United Kingdom now number, with harbor-lights, upwards of 500 stations, and include some of the finest specimens of engineering, such as Smeaton's Eddystone, Robert Stevenson's Bell rock, Alan Stevenson's Skerryvore, and James Walker's Bishop rock. More recently, somewhat similar structures have been erected on the Wolf rock in the English channel by Mr. Douglass, and on the Duheartach rock, Argyleshire, and on the Chickens, off the isle of Man, by Messrs. D. & T. Stevenson. As information will be found under their respective heads regarding some of these interesting works, we shall restrict ourselves in the following short memoir to the most approved means of producing a powerful light for the use of the mariner.

Catoptric or Reflecting System.—All of those rays of light proceeding from the focus of a paraboloid which fall upon its surface are reflected parallel to the axis so as to form a solid beam of light. When a series of such reflectors are arranged close to each other round a cylinder in a light-house, they illuminate constantly, though not with equal intensity, the whole horizon. As the property of the parabolic reflector is to collect the rays incident upon its surface into one beam of parallel rays, it would be absolutely impossible, were the flame from which the rays proceed a mathematical point, to produce a light which would illuminate the whole of the horizon, unless there were an infinite number of reflectors. But as the radiant, instead of being a mathematical point, is a physical object, consisting of a flame of very notable size, the rays which come from the outer portion of the luminous cone proceed, after reflection, in such divergent directions as to render it practically possible to light up, though unequally, the whole horizon. The useful divergence produced in this way by a burner of one inch in diameter, with a focal distance of four inches, is in the horizontal plane about 14° 22'. The whole horizon may thus be illuminated by reflectors.

If, for the purpose of distinction, it is desired to show a *revolving* light, then several of those reflectors are placed with their axes parallel to each other on each of the faces of a four-sided frame, which is made to revolve. In such a case, the mariner sees a light only at those times when one of the faces of the frame is directed towards him, but at other times he is left in darkness. The rotation of the frame upon its axis thus produces to his eye a succession of light and dark intervals, which enables him to distinguish it from the fixed light which is constantly in view in every azimuth. The distinction of a red light is produced by using a chimney of red instead of white glass for each burner. The *flashing* or scintillating light, giving, by rapid revolutions of the

frame, flashes once every five seconds, which is one of the most striking of all the distinctions, was first introduced by the late Mr. Robert Stevenson, the engineer of the northern light-houses, in 1822, at Rhinns of Islay, in Argyleshire. The same engineer also introduced what has been called the *intermittent* light, by which a stationary frame with reflectors is instantaneously eclipsed, and is again as suddenly revealed to view by the vertical movement of opaque cylinders in front of the reflectors. The intermittent is distinguished from the revolving light, which also appears and disappears successively to the view, by the suddenness of the eclipses and of the reappearances, whereas in all revolving lights there is a gradual waxing and waning of the light. The late Mr. Wilson introduced at Troon harbor an intermittent light which was produced by a beautifully simple contrivance for suddenly lowering and raising a gas-flame. Mr. Robert Louis Stevenson has proposed an intermittent light of *unequal periods* by causing unequal sectors of a spherical mirror to revolve between the flame and a fixed dioptric apparatus (such as that shown in fig. 1). The power of the light is increased by the action of the spherical mirror, which also acts as a mask in the opposite azimuths. The number of distinctive light-house characteristics has not yet been exhausted in practice, for various other distinctions may be produced by combination of those already in use; as, for example, revolving, flashing, or intermittent lights might be made not only red and white alternately, but two red or white, with one white or red. Similar combinations could of course be employed where two lights are shown from the same or from separate towers.

Dioptric System.—Another method of bending the diverging rays proceeding from a lamp into such directions as shall be useful to the mariner is that of *refraction*. If a flame be placed in the focus of a lens of the proper form, the diverging rays will be bent parallel to each other, so as to form a single solid beam of light. M. Augustin Fresnel was the first to propose and to introduce lenticular action into light-house illumination, by the adoption of the annular or built lens, which had been suggested as a burning instrument by Buffon and Condorcet. He also, in conjunction with Arago and Mathieu, used a large lamp having four concentric wicks. In order to produce a revolving light on the lenticular or dioptric system, a different arrangement was adopted from that which we have described for the catoptric system. The large lamp was now made a fixture, and four or more annular lenses were fitted together, so as to form a frame of glass which surrounded the lamp. When this frame is made to revolve round the lamp, the mariner gets the full effect of the lens whenever its axis is pointed toward him, and this full light fades gradually into darkness as the axis of the lens passes from him. In order to operate upon those rays of light which passed above the lens, a system of *double* optical agents was employed by Fresnel. These consisted of a pyramid of lenses with mirrors placed above at the proper angle for rendering the rays passing upward parallel to those which came from the annular lens. But Fresnel did not stop here, for, in order to make the lenticular system suitable for fixed as well as revolving lights, he designed a new optical agent, to which the name of *cylindric refractor* has been given. This consisted of cylindrical lenses, which were the solids that would be generated were the middle vertical profile of an annular lens made to circulate round a vertical axis. The action of this instrument is obviously, while allowing the rays to spread naturally in the horizontal plane, to suffer refraction in the vertical plane. The effect of this instrument is, therefore, to show a light of equal intensity constantly all round the horizon, and thus to form a better and more equal light than that which was formerly produced for fixed lights by parabolic reflection. It is obvious, however, from our description that the diverging rays which were not intercepted by this cylindric hoop, or those which would have passed upward and been uselessly expended in illuminating the clouds, or downward in uselessly illuminating the light-room floor, were lost to the mariner; and in order to render these effective Fresnel ultimately adopted the use of what has been called the internal or total reflection of glass; and here it is necessary to explain that one of the great advantages of the action by glass over reflection by metal is the smaller quantity of light that it absorbs. It has been ascertained that there is a gain of nearly one-fourth (.249) by employing glass prisms instead of metallic reflectors for light-house illumination. There were, therefore, introduced above and below the cylindric refracting hoop which we have described, separate glass prisms of triangular section, the first surface of each of which refracted to a certain extent any ray of light that fell upon it, while the second surface was placed at such an angle as to reflect, by total reflection, the ray which had before been refracted by the first surface; and the last or outer surface produced another refraction, which made the rays finally pass out parallel with those refracted by the central cylindric hoop. The light falling above the cylindric hoop was thus by refractions and reflections bent downward, and that falling below was bent upward, so as to be made horizontal and parallel with that proceeding from the refracting hoop. Fig. 1 represents in vertical section this, which is the most perfect of Fresnel's inventions in light-house illumination, especially when made in pieces of the rhomboidal form, and used in connection with the diagonal framing introduced by Mr. Alan Stevenson. In the fig., *p* shows the refracting and totally reflecting prisms, and R the cylindric refractor.

From what has been stated, it will be readily seen that, in so far as regards fixed lights, which are required to illuminate *constantly* the whole of the horizon with equal

intensity, the dioptric light of Fresnel with Mr. Alan Stevenson's improvements is a perfect instrument. But the case is different as regards revolving lights, or those where the whole rays have to be concentrated into one or more beams of parallel rays. To revert to the parabolic reflector, it must be obvious that all rays which escape past the lips of the reflector, never reach the eye of the mariner, while, if we return to the dioptric revolving light of Fresnel, we find that those rays which escape past the lens are acted on by *two* agents, both of which cause loss of light by absorption. The loss occasioned by the inclined mirrors, and in passing through the pyramidal inclined lenses, was estimated by Fresnel himself at *one-half* of the whole incident rays. In order to avoid this loss of light, Mr. Thomas Stevenson proposed, in 1849, to introduce an arrangement by which the use of one of these agents is avoided, and the employment of total reflection, which had been successfully employed by Fresnel for fixed lights, was introduced with great advantage for revolving lights.

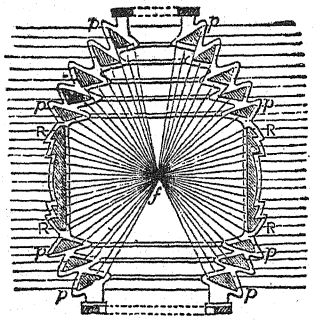


Fig. 1.

"This effect may be produced in the case of metallic reflectors by the combination of an annular lens, L (fig. 2); a parabolic conoid, *a*, truncated at its parameter, or between that and its vertex; and a portion of a spherical mirror, *b*. The lens, when at its proper focal distance from the flame, subtends the same angle from it as the outer lips of the paraboloid, so that no ray of light coming from the front of the flame can escape being intercepted either by the paraboloid or the lens. The spherical reflector occupies the place of the parabolic conoid which has been cut off behind the parameter. The flame is at once in the center of the spherical mirror, and in the common focus of the lens and paraboloid. The whole sphere of rays emanating from the flame may be regarded as divided into two hemispheres. Part of the anterior hemisphere of rays is intercepted by the lens, and made parallel by its action, while the remainder is intercepted by the paraboloidal surface, and made parallel by its action. The rays forming the posterior hemisphere fall on the spherical mirror behind the flame, and are reflected forwards again through the focus in the same lines, but in opposite directions to those in which they came, whence passing onwards they are in part refracted by the lens, and the rest are made parallel by the paraboloid. The back rays thus finally emerge horizontally in union with the light from the anterior hemisphere. This instrument, therefore, fulfills the necessary conditions, by collecting the *entire sphere of diverging rays into one beam of parallel rays without employing any unnecessary agents.*"

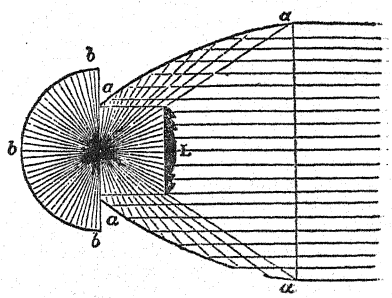


Fig. 2.

What has been just described is what Mr. Stevenson terms a *catoptric holophote*. What follows is a description of his *dioptric holophote*, in which total reflection, or the most perfect system of illumination, is adopted. The front half of the rays is operated upon by totally reflecting glass prisms, similar in section to those applied by Fresnel for fixed lights; but, instead of being curvilinear in the horizontal plane only, they are also curvilinear in the vertical plane, and thus produce, in union with an annular lens, a beam of parallel rays similar to what is effected by the parabolic mirror. The rays proceeding backwards fall upon glass prisms, which produce two total reflections upon each ray, and cause it to pass back through the flame, so as ultimately to fall in the proper direction upon the dioptric holophote in front, so that the whole of the light proceeding from the flame is thus ultimately parallelized by means of the smallest number and the best kinds of optical agents. It is a remarkable property of the spherical mirror that no ray passes *through* it, so that an observer, standing behind the instrument, perceives no light, though there is nothing between him and the flame but a screen of transparent glass.

Where the light is produced by a great central stationary burner, the apparatus assumes the form of a polygonal frame, consisting of sectors of lenses and holophotal prisms, which revolves round the flame, and each face of which produces a beam of parallel rays. Hence, when the frame revolves round the central flame, the mariner is alternately illuminated and left in darkness, according as the axis of each successive face is pointed toward him or from him. In the revolving holophotol light one agent is enabled to do the work of two agents in the revolving light of Fresnel, as total reflection, or that by which least light is lost, is substituted for metallic reflection. The dioptric holophotal system, or that by which *total reflection is used as a portion of the revolving apparatus*, was first employed on a small scale in 1850 at the Horsburg light-

house, and on the large scale in 1851 at North Ronaldshay in Orkney. Since that date this system has been all but universally introduced into Europe and America.

Azimuthal Condensing Light.—The above is a description of the general principles on which light-houses are illuminated. In placing a light in some situations, regard, however, must be had to the physical peculiarities of the localities; the following plans of Mr. Thomas Stevenson may be cited as examples. In fixed lights of the ordinary construction, the light is distributed, as already explained, equally all round the horizon, and is well adapted for a rock or island surrounded by the sea. But where it is only necessary to illuminate a narrow sound, it is obvious that the requirements are very different. On the side next the shore, no light is required at all; across the sound, a feeble light is all that is necessary, because the distance at which it has to be seen is small, owing to the narrowness of the channel; while up the sound and down the sound the sea to be illuminated is to be of greater or lesser extent, and requires a corresponding intensity. If the light were made sufficiently powerful to answer for the greater distance, it would be much too powerful for the shorter distance across the sound. Such an arrangement would occasion an unnecessary waste of oil, while the light that was cast on the landward side would be altogether useless. Fig. 3 represents (in plan) the condensing light, by which *the light proceeding from the flame is allocated in the different azimuths in proportion to the distances at which the light requires to be seen by the mariner in those azimuths.* Let us suppose that the rays marked α require to be seen at the greatest distance down the sound, and those marked β to a somewhat smaller distance up the sound. In order to strengthen those arcs, the spare light proceeding landwards, which would otherwise be lost, is intercepted by portions of holophotes, B and C, subtending spherical angles proportioned to the relative ranges and angular spaces of the arcs α and β. The portions of light thus intercepted are parallelized by the holophotes, and fall upon *straight* prisms *a*, *a*, and *b*, *b*, respectively, which again refract them in the horizontal plane only; and, after passing through focal points (independent for each prism), they emerge in separate equal beams, and diverge through the same angles as α and β respectively. In this way, the light proceeding up and down the sound is strengthened in the required ratio by utilizing, in the manner we have described, the light which would otherwise have been lost on the land. These instruments were first introduced at three sound lights in the w. of Scotland, in 1857, where apparatus of a small size, combined with a small burner, was found to produce, in the only directions in which the great power was required, beams of light equal to the largest class of apparatus and burner. The saving thus effected in oil, etc., has been estimated at about £400 or £500 per annum for these three stations.

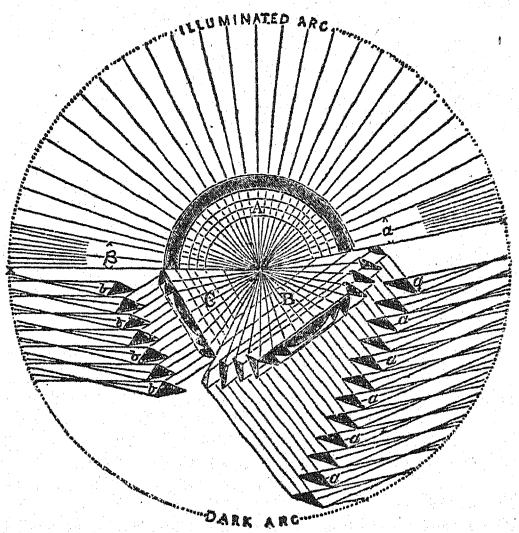


Fig. 3.

Apparent Light.—At Stornoway bay, the position of a sunk rock has been sufficiently indicated by means of a beam of parallel rays *thrown from the shore* upon certain optical apparatus fixed in the top of a beacon erected upon the rock itself. It was suggested that the light-house should be built on the outlying submerged reef, but the cost would have been very great, and Mr. Stevenson's suggestion of the apparent light was adopted. By means of this plan the expense of erecting a light-house on the rock itself has been saved, and all the purposes of the mariner served. It has been called an apparent light from its *appearing to proceed from a flame on the rock, while the light in reality proceeds from the shore*, about 650 ft. distant, and is refracted by glass prisms placed on the beacon.

Floating lights are vessels fitted with lights moored at sea in the vicinity of reefs. Prior to 1807 the lantern was hung at the yard-arm. The late Mr. Robert Stevenson then introduced the present system of lanterns, having a copper tube in the center capable of receiving the vessel's mast, which passed through the tube, the lights being placed all round. In this way proper optical appliances can be employed, and the lantern can be lowered on the mast so as to pass through the roof of a house on the deck, where the lamps are filled or trimmed. In 1864 six floating lights were constructed for the Hoogly under the directions of Messrs. Stevenson, in which the dioptric principle

was applied. Eight half-fixed light apparatus of glass with spherical mirrors behind were placed in the lantern round the mast, so as to show in every azimuth rays from three of them at once.

Differential Lens.—This is an annular lens, curved to different radii on both sides, so as to increase the divergence in any given ratio. The small arc of about 6°, which is unequally illuminated by the lens as presently constructed, may be made of equal intensity throughout by the differential form, or by means of separate straight prisms placed at the sides.

Sources of Light.—The descriptions which have already been given have all had reference to the best means of employing a given light. Many attempts have from time to time been made to increase the power of the radiant itself.

Magneto-electric Light.—The electric light, which has of late been greatly developed and improved, and especially adapted to light-house purposes, was introduced under the auspices of the Trinity house of London.

Gas.—The uncertainty and other objections attending the manufacture and use of gas in remote and inaccessible places have, with some exceptions, as yet prevented its adoption at light-house stations, but it has been successfully used at many harbor-lights.

Oil and Paraffine.—The oil which is chiefly employed in Great Britain is that which goes by the name of *colza*, and the quantities annually consumed at the northern light-houses may be stated at 40 galls. for an argand 1 in. in diameter, and 800 galls. for the four-wick burner, which is used in dioptric lights of the first order. Capt. Doty's burner for paraffine, which is the best which has as yet been suggested, has been introduced into the French and the Scotch light-houses. Paraffine has been found to give a more intense light than colza at half the cost.

Visibility of Lights.—The distance at which any light can be seen, of course depends on the height of the tower, and varies with the state of the atmosphere. The greatest recorded distance at which an oil light has been visible is that of the holophotal light of Allepey at Travancore, which has been seen from an elevated situation at a distance of 45 miles. The holophotal revolving light at Baccalieu, in Newfoundland, is seen every night in clear weather at cape Spear, a distance of 40 nautical miles.

Power of Light-house Apparatus.—The reflector (25 in. diam.) used in the northern light-houses, with a burner of 1 in. diam., is considered equal to about 360 argand flames. The cylindric refractor, used in fixed lights, with a four-wick burner, has been estimated at 250; while the annular lens in revolving lights, with the same burner, is equal to about 3,000 argand flames. See LIGHTING OF BEACONS AND BUOYS AT SEA.

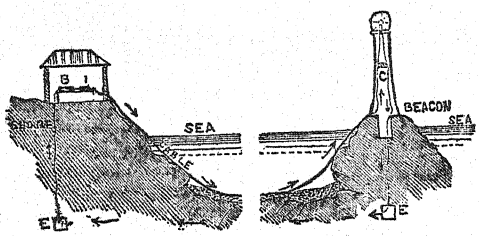
LIGHT-HOUSE (*ante*). Light-houses were not constructed until some advancement was made in navigation, but beacon-fires were lighted for the guidance of the early mariners. The most celebrated ancient light-house was the Pharos (q.v.) of Alexandria, built upon a rocky point of that name which had been an islet, but was connected by Alexander the great with Alexandria by a roadway called the seven-mile mole, or *heptastadium*. The light-house was commenced by Ptolemy Soter, and finished about 280 B.C., and was regarded as one of the wonders of the world. It was about 400 ft. high, and the light which was kept burning on its top could be seen, according to Josephus, at a distance of 40 miles. It is thought to have been destroyed by an earthquake after having stood 1600 years. It was constructed in the form of the frustrum of a square pyramid, having an immense base whose dimensions are not known. The tower of Cordouan, at the mouth of the Garonne, in the bay of Biscay, is another celebrated light-house, but of modern date and still standing. It was commenced in 1584 and finished in 1610 by Louis de Foix. It stands upon a rocky ledge, which is under water except at low tide. The base is the frustrum of a cone, 135 ft. in diameter at the bottom, 16 ft. high, and 125 ft. in diameter at the top; built solid of cut stone, with the exception of a chamber in the center, 20 ft. square and 8 ft. high, containing a water cistern. A wall 12 ft. high and 11 ft. thick stands upon the margin of the upper surface of the base. The tower is 50 ft. in diameter at its base, is 115 ft. high, and is the frustrum of a cone, surmounted by a lantern dome. The entire height from the rock is 162 ft., the whole height of the tower, including the dome, being 146 feet. The first Fresnel lens ever manufactured was placed in this light-house in 1823. The Eddystone light-house in the English channel is described under the title EDDYSTONE (*ante*). The Bell rock light-house, off the e. coast of Scotland, is built upon a reef or rocks in the German ocean, 11 m. from the coast, nearly opposite the Tay firth. The rock upon which it stands is a red sandstone, from 12 to 15 ft. below spring tide, with from 2 to 4 ft. exposure at low tide. The structure is also of sandstone, but the outer tiers for 30 ft. high are of granite. It was designed by the celebrated Scotch engineers, Robert Stevenson and John Rennie, and constructed by the former. The erection of the second Eddystone light-house had given Smeaton much study, and his experience was taken advantage of by Stevenson in the structure at Bell rock. In form it resembles the Eddystone. The diameter at the base is 42 ft., while at the top, beneath the cornice, it is 15 feet. The stone-work is 102½ ft. high, and the whole structure, including the lantern, 115 feet. See BELL ROCK, *ante*. The Skerryvore light-house, built upon the Skerryvore rocks, which lie in the tracks of vessels going around the north of Ireland

or Scotland from the Clyde and Mersey, was constructed by Alan Stevenson, the son of Robert. See SKERRYVORE, *ante.* There are many very fine light-houses in the United States, the most noted of which was erected upon Minot's ledge, off the town of Cohasset, Massachusetts bay, about 20 m. e.s.e. of Boston, and one of the most dangerous places in the world without a signal. The difficulties in the construction of a light-house upon this rock were immense. An iron structure was first erected, being completed in 1849, which stood till April, 1851, when it was demolished by a terrific storm. The iron piles, 10 in. in diameter and sunk 5 ft. into the rock, were twisted off near the surface. In 1852 money was appropriated by congress for a new light-house, and work was commenced in 1855, but it was not till the latter part of 1857 that the first stone was laid. Four stones were laid in this year; six courses were, however, laid in 1858; and in 1859 the stone-work was completed. The whole was finished in 1860. It is a granite tower in the form of the frustrum of a cone, having a base 30 ft. in diameter, and a height of stone-work of 88 ft., the lower 40 ft. being solid. The courses are dove-tailed, and are fastened together with wrought-iron dowels. The defect in the iron Minot's ledge light-house was owing to the stinted outlay. Had three or four times as much money been expended on it, so that it could have been much broader at the base as well as higher, it would doubtless have been standing to-day. The present stone structure is a fair model of engineering, and will probably resist the waves for centuries. It possesses the advantage, which all solid or almost solid stone structures must have over iron framework, of a vastly greater amount of inertia, an important element of resistance to the waves. Its construction is said to have offered a more difficult problem than that of Bell rock or Skerryvore, one reason being that its foundation is deeper beneath the surface. The light-house at Spectacle reef, in the northern part of lake Huron, was built not only to resist waves, but ice-fields, often covering thousands of acres and moving at the rate of 2 or 3 m. per hour. That the structure should be able to withstand this force it was so designed as to cause the ice to be broken and piled into a protecting barrier. The tower is the frustrum of a cone, 32 ft. in diameter at the base, and 18 ft. just beneath the cornice at a height of 80 feet. The whole height of stone-work is 93 ft. above the base, which is 11 ft. below the surface of the water. The tower is solid as high as 34 ft., above which it contains 5 stories, each 14 ft. in diameter. The work was commenced May 1, 1870, and the light was first used June 1, 1874. The cost was $375,000. The first *cast-iron* light-house ever erected was at Point Morant, Jamaica, in 1842. The tower is built of 9 tiers of plates three-quarters of an in. thick and 10 ft. high, held together by bolts and flanges on the inside. The tower is filled in with masonry and concrete to the height of 27 feet. It rests upon a foundation of granite and rises to a height of 96 feet. It is 18½ ft. in diameter at the base, and 11 ft. at the top. A modern form of light-house is constructed on what is called the "screw-pile" system, an invention of Alexander Mitchell, who, with his son, laid the foundation of the light-house on Maplin sand, at the mouth of the Thames, England. Two similar structures followed, Chapman head in 1849 and Gunfleet in 1850, also near the mouth of the Thames. Other screw-pile lights were afterwards erected in different parts of the kingdom. The great feature of the screw-pile is that the piles upon which it rests are in the form of screws and are driven in the sand or soil to a sufficient depth in the manner of a corkscrew. The first screw-pile light-house erected in the United States was by by col. Hartman Bach, U. S. E., at the mouth of Delaware bay, 8 m. from the ocean, in 1847–50, where it stands at the present time in good condition, although in an exposed place, being often acted against by immense cakes or fields of ice which come down the Delaware and move to and fro with the ebb and flow of the tide. It is surrounded by an ice-breaker composed of screw-piles driven independently of the tower. The screw-pile light-house at Sand Key, Florida reefs, is supported on 16 piles, with an auxiliary pile in the center to support the staircase, making in all 17. They are 8 in. in diameter, with a screw of 2 ft. in diameter at the lower ends, which are bored 12 ft. into the reef. The framework of the tower consists of cast-iron tubular columns framed together, having wrought-iron ties at each joint, and braced diagonally on the faces of each tier. The keeper's house is supported by cast-iron girders and joists 20 ft. above the foundation. The structure is 120 ft. above the level of the water. The foundation is 50 ft. in diameter. Over 50 such light-houses have been erected in various parts of the United States.

LIGHT-HOUSE BOARD OF THE U. S., a body organized in accordance with an act of congress, approved Aug. 31, 1852, and having the control and management of all lights, buoys, beacons, etc., on the coasts of the United States. It consists of eight persons, viz., two officers of high rank in the navy, two officers of the corps of engineers, two civilians of high scientific attainments, an officer of the navy, and an officer of the corps of engineers—the two latter serving as secretaries. The board as thus constituted is attached to the office of the secretary of the treasury, who is *ex-officio* president of the same. A chairman, elected by the members from their own number, is chosen to preside in the absence of the president *ex-officio.* The board is required to meet four times a year, and the secretary of the treasury is empowered to call it together whenever, in his judgment, the exigencies of the service may require a meeting. It actually meets almost every week in the year. The coast and the waters of the country

are divided into districts, each of which is served by an officer of the army or the navy in the capacity of light-house inspector, and other officers are employed from time to time, according to the exigencies of the service. The different subjects requiring attention are first referred to standing committees, whose duty it is to investigate and report to the board what action, if any, is required. The two secretaries perform all routine and general administrative duties under the orders and regulations of the board.

LIGHTING OF BEACONS AND BUOYS AT SEA. The plan hitherto generally in use for illuminating a rock or reef where no light-house could be built is by means of an "apparent light," as in the case of a reef at Stornoway (see LIGHT-HOUSE). Of late, trial has extensively and successfully been made of electricity for this purpose. At various times, since the discovery of the electric light by sir H. Davy in 1813, suggestions have been made pointing out the advantages which might be derived from its use upon light-houses. It has long been plain, indeed, that for a purpose of this kind it had properties which placed it far in advance of all other lights—such as its near approach to sunlight in brightness, its great power of penetrating fogs, and its total independence of atmospheric air, which enables it to be produced in a vacuum or under water. Unfortunately, its production is attended with great trouble; it also requires rare skill to keep it in perfect order, and, even where this is at hand, we cannot yet place absolute reliance upon its steadiness. It has nevertheless been in use at Dungeness, in the s. of England, since 1862; and has been introduced with success at Souter point, Tynemouth (1871), at South Foreland (1873), and at the Lizard light-house (1878). It is used also at three French light-houses, at Odessa, and at Port Said at the entrance of the Suez canal. At Souter point the rearward rays of the light are reflected downwards, and used as a light in a different direction on a lower level. Whether or not the electric light is to be ultimately adopted for properly constructed light-houses, there can be little doubt that for the illumination of beacons, where no light-keeper is on the spot, electricity would be a most desirable agent to produce the light. As far as can be at present seen, the ordinary electric light (q.v.) may be dismissed as unsuitable for beacons. It will at least require to be greatly simplified before it can be used for such a purpose. In the article INDUCTION OF ELECTRIC CURRENTS will be found a description of the method of producing sparks by means of an induction coil. These sparks can be made to follow each other so quickly as to appear like a flash surrounded by a luminous haze. Taking advantage of this power of electricity, Mr. Thomas Stevenson proposed in 1866 to apply it to the illumination of beacons, and in that year a series of interesting experiments were made at Newhaven pier, with the aid of instruments constructed by Mr. Hart of Edinburgh. Although up to this time no further steps have been taken to make practical application of this suggestion, the proposal merits attention for its ingenious application of a scientific fact which had not as yet been successfully put to such a use. In the experiments referred to, the electric current passed through a wire 800 ft. long. Suppose a beacon to be situated at some distance from the shore, as shown upon the annexed diagram. A galvanic battery consisting of, say, six Bunsen cells, is placed at B in a house upon the shore. From this the electrical current is conveyed along a submarine cable to the beacon, and returns by earth-plates at E, E, in the usual manner to complete the circuit; its course being indicated on the diagram by arrows. The induction coil is placed upon the beacon at C, and properly connected with the conducting wire of the cable, so as to make the current generated by the battery traverse its primary coil. A wire from each end of its secondary coil is then conveyed to the focus of the optical apparatus, the ends of the two wires being here brought within half an inch of each other, and furnished with indestructible points of platinum. The induced or secondary current, in crossing this narrow space, produces the succession of sparks which constitute the light, but, as explained under the head INDUCTION OF ELECTRIC CURRENTS, it only does so at the moment the current is interrupted or broken. It is consequently necessary to have some means of completing and breaking the galvanic circuit in rapid alternations, so as to produce the flashes in quick succession. The break for this purpose is placed at I, near the battery.



In the experiments now described a great deal was found to depend upon the peculiar way the current was broken. None of the breaks in use giving a successful result, Mr. Hart devised a new one of an ingenious construction, which produced a more constant and powerful light. The difference between it and other mercury or spring breaks lies in the fact that with them the current is off and on for nearly equal spaces of time; but this one is so contrived that the wire is three times longer in the mercury than it is out of it; consequently, the current is three times longer on than it is off, and so allows the soft iron core of the induction coil to be more fully magnetized. The result of this

is a secondary current of comparatively high intensity, and of course the production of more brilliant sparks between its two terminals. We may explain that the moment the wire touches the mercury the current passes, and the moment it is removed the current stops. The wire alternately dips and rises by the action of an ordinary electro-magnet.

By the use of more than one induction coil the light could be materially increased, so that there seemed a likelihood of being able to produce it powerful enough to be seen at the distance of a few miles. Another method of lighting buoys as well as beacons without the aid of electricity has lately been shown to be practicable. Coal or other inflammable gas can be so compressed that a buoy may be made to receive at once and store up as much condensed gas as will suffice to keep a steady flame burning for a month or more. Gas for this purpose can be economically manufactured from some of the waste products of shale-oil works. Mr. Stevenson has also suggested the employment of electricity to ring bells, so as to give warning to sailors in foggy weather.

LIGHTNING (Fr. *éclair*, Ger. *Blitz*), the name given to the sudden discharge of electricity between one group of clouds and another, or between the clouds and the ground. It is essentially the same, though on a much grander scale, as the spark obtained from an electric machine. Clouds charged with electricity are called thunder-clouds, and are easily known by their peculiarly dark and dense appearance. The height of thunder-clouds is very various; sometimes they have been seen as high as 25,700 feet, and a thunder-cloud is recorded whose height was only 89 feet above the ground. According to Arago, there are three kinds of lightning, which he names lightning of the first, second, and third classes. Lightning of the first class is familiarly known as forked lightning (Fr. *éclair en zig-zag*). It appears as a broken line of light, dense, thin, and well defined at the edges. Occasionally, when darting between the clouds and the earth, it breaks up near the latter into one or two forks, and is then called bifurcate or trifurcate. The terminations of these branches are sometimes several thousand feet from each other. On several occasions the length of forked lightning has been tried to be got at trigonometrically, and the result gave a length of several miles. Lightning of the second class is what is commonly called sheet-lightning (Ger. *Flächenblitz*). It has no definite form, but seems to be a great mass of light. It has not the intensity of lightning of the first class. Sometimes it is tinged decidedly red; at other times, blue or violet. When it occurs behind a cloud, it lights up its outline only. Occasionally, it illumines the world of clouds, and appears to come forth from the heart of them. Sheet-lightning is very much more frequent than forked-lightning. Lightning of the third kind is called ball-lightning (Fr. *globes de feu*, Ger. *Kugelblitz*). This so-called lightning describes, perhaps, more a meteor, which, on rare occasions, accompanies electric discharge, or lightning proper, than a phenomenon in itself electrical. It is said to occur in this way: After a violent explosion of lightning, a ball is seen to proceed from the region of the explosion, and to make its way to the earth in a curved line like a bomb. When it reaches the ground it either splits up at once and disappears, or it rebounds like an elastic ball several times before doing so. It is described as being very dangerous, readily setting fire to the building on which it alights; and a lightning-conductor is no protection against it. Ball-lightning lasts for several seconds, and, in this respect, differs very widely from lightning of the first and second classes, which are, in the strictest sense, momentary.

The thunder (Fr. *tonnerre*, Ger. *Donner*) which accompanies lightning, as well as the snap attending the electric spark, has not yet been satisfactorily accounted for. Both, no doubt, arise from a commotion of the air brought about by the passage of electricity; but it is difficult to understand how it takes place. Suppose this difficulty cleared, there still remains the prolonged rolling of the thunder, and its strange rising and falling to account for. The echoes sent between the clouds and the earth, or between objects on the earth's surface, may explain this to some extent, but not fully. A person in the immediate neighborhood of a flash of lightning hears only one sharp report, which is peculiarly sharp when an object is struck by it. A person at a distance hears the same report as a prolonged peal, and persons in different situations hear it each in a different way. This may be so far explained. The path of the lightning may be reckoned at one or two miles in length, and each point of the path is the origin of a separate sound. Suppose, for the sake of simplicity, that the path is a straight line, a person at the extremity of this line must hear a prolonged report; for though the sound originating at each point of the path is produced at the same instant, it is some time before the sound coming from the more distant points of the line reaches the ear. A person near the middle of the line hears the whole less prolonged, because he is more equidistant from the different parts of it. Each listener in this way hears a different peal, according to the position he stands in with reference to the line. On this supposition, however, thunder ought to begin at its loudest, and gradually die away, because the sound comes first from the nearest points, and then from points more and more distant. Such, however, it is well known, is not the case. Distant thunder at the beginning is just audible, and no more; then it gradually swells into a crashing sound, and again grows fainter, till it ceases. The rise and fall are not continuous, for the whole peal appears to be made up of several successive peals, which rise and fall as the whole. Some have attempted to account for this modulation from the forked form of the light-

ning, which makes so many different centers of sound, at different angles with each other, the waves coming from which interfere with each other, at one time moving in opposite directions and obliterating the sound, at another in the same way, and then strengthening the sound produced by each. Thunder has never been heard more than 14 m. from the flash. The report of artillery has been heard at much greater distances. It is said that the cannonading at the battle of Waterloo was heard at the town of Creil, in the n. of France, about 115 m. from the field.

LIGHTNING (*ante*). The abbé Nolet is said to have been the first to remark the similarity of phenomena in discharges of lightning and of the electrical machine, but there was no experimental determination of the identity of their nature until Benjamin Franklin made his celebrated investigation of the subject by the use of a kite at Philadelphia in 1752. Three years previous to this, however, he made some interesting remarks upon the subject in his *Observations on Electricity*, showing that his mind had comprehended the causes even before he made his demonstrative experiments. He says: "Where there is a great heat on the land in a particular region the lower air is rarefied and rises; the cooler, denser air above it descends; the clouds in the air meet from all sides and join over the heated place; and if some are electrified, others not, lightning and thunder succeed and showers fall. Hence, thunder gusts after heats, and cool air after gusts. As electrical clouds pass over a country, high hills, trees, towers, chimneys, etc., draw the electric fire, and it is therefore dangerous to take shelter under a tree during a thunder gust. It is safer to be in the open fields for another reason. When the clothes are wet, if a flash, in its way to the ground, should strike your head it may run in the water over the surface of your body, whereas if your clothes were dry it would go through the body." Again: "Now, if the fire of electricity and that of lightning be the same, as I have endeavored to show in a former paper, and a tube of only 10 ft. long will discharge its fire at 2 or 3 in. distance, an electrified cloud of perhaps 10,000 acres may strike and discharge on the earth at a proportionally greater distance." Speaking of the discharging power of points he says: "May not a knowledge of this power of points be of use to mankind in preserving houses, churches, ships, etc., from the stroke of lightning by directing us to fix, on the highest parts of those edifices, upright rods of iron made sharp as a needle, and gilt to prevent rusting, and from the foot of the rods a wire down the outside of the building into the ground, or down round one of the shrouds of a ship, and down her sides till it reaches the water? Would not the pointed rods probably draw the electric fire silently out of the cloud before it came near enough to strike, and thereby secure us from the most sudden and terrible mischief?" He proposed various experiments, and, acting under his instructions, Dalibard had drawn electric sparks from an iron rod 40 ft. high at Marly in France, and had charged Leyden jars with the apparatus, May 10, 1752. Franklin did not make his kite-experiment till more than a month later, viz., June 15. It was natural that these experiments should be repeated all over the civilized world. Prof. Richman of St. Petersburg was killed, in the summer of 1753, by a bolt of lightning in the form of a blue ball as large as a man's fist which leaped from the insulated conductor to his head, which was about a foot distant. His companion was struck senseless and a door was torn from its place by the stroke. In the experiment of M. Romas of Nerac, France (see *ante*), which has been said by some to antedate Franklin's, he used a kite of about 18 sq.ft. surface, with a copper wire wound around the string, and an insulating silk cord at the ground end, near which an iron tube was placed as a secondary conductor. When the kite was at a height of 550 ft. during a storm, flashes of fire darted to the earth attended by loud explosions, and all light bodies in the vicinity were alternately, positively and negatively, electrified and propelled in various directions.

It has been shown by Cavallo, De Saussure, and others that the electrical condition of the atmosphere, in comparison with that of the earth, is positive; also, by Laplace, Lavoisier, Volta, and De Saussure that the cause of atmospheric electricity is evaporation from the surface of the earth; but, according to the experiments of Pouillet, evaporation does not produce opposite electrical conditions unless accompanied by chemical decomposition or separation of vapor from saline solutions, or from oxidizing surfaces or the leaves of growing plants. Currents of wind rushing over opposing objects, occasioning disturbance of electric equilibrium, are among the chief causes of atmospheric electricity, the electricity passing with the wind to elevated regions; or, on the two-fluid hypothesis, positive electricity being carried upwards, while the negative passes to the earth. In regard to the production of the various kinds of lightning and thunder, they may be explained according to a variety of circumstances. To account for the variations in tone and intensity of a thunder-clap as heard at a certain point—that is to say, to explain what conditions were present and what form or dimensions the discharge had—would be very difficult, perhaps impossible, from the fact that it is impossible to appreciate the extent of the process and the direction of the discharge or discharges. The reverberation of sound may be the result of one discharge, which is echoed from peak to peak or from crag to crag and probably from cloud to cloud, although the power of clouds to reflect sounds has not been determined. There may be a succession of discharges from different portions of different clouds to those of others, one explosion being succeeded by another in consequence of changes of electrical con-

ditions in various parts of the celestial and terrestrial apparatus. The increased intensity of a roll of thunder is probably to be accounted for in this way. The first sounds may be produced by successive minor discharges, causing electrical conditions between two large masses of clouds, or between a large mass and the earth, which result in the exchange of large quantities of electric fluid, or the descent of a powerful bolt to the earth. Although many phenomena of electricity are well known, and the electricity of chemical batteries can be measured and rendered serviceable, still its real nature is not known. It is not positively determined whether it is an imponderable body, an imponderable force, or merely a phenomenon resulting from the conditions of the matter with which it is connected. Until its nature be determined it cannot be said whether a ball of lightning is a moving mass of electrical matter, or of other matter in a peculiar electrical state. There is something wonderfully interesting and inexplicable in some of these moving masses of apparent fire. The ordinary laws of electrical attraction and repulsion will scarcely serve to explain their various freaks. They often seem as if propelled from behind, in the manner of an ordinary projectile; and the manner in which they pass into dwellings and demolish walls may indicate that they are driven against bodies, and not attracted by them.

LIGHTNING, ACCIDENTS FROM. According to the registrar-general's report of births, deaths, and marriages for the year 1871, it appears that during that year 28 persons were killed in England by lightning: none in London, 5 in the south-eastern division, 6 in the south midland, 1 in the eastern, 1 in the south-western, 2 in the west midland, 6 in the north midland, 4 in the north-western, 2 in Yorkshire, and 1 in the northern division. All except 5 were men, and chiefly laborers in the open air. In 1875 17 persons were killed; in 1877 only 10. Of 24 deaths from this cause in a previous report, 11 took place in summer, 10 in spring, 2 in autumn, and 1 in winter. Out of 103 deaths in 5 years (1852–56), there were 38 in July, and 22 in Aug.

A person struck by lightning is more or less stunned and deprived of consciousness for a time, often, no doubt, by mere fright, in which case the effect is transient; but sometimes in consequence of a shock given to the brain, in which latter case there is a certain amount of paralysis of motion and sensation. In a case recorded by Boudin in his *Géographie Médicale*, 1857, a gentleman who had been struck by lightning remained for an hour and a quarter apparently devoid of any indication of life; and the paralysis, which usually affects the lower limbs, may last for many months. Mr. Holmes, in his article on "Accidents from Lightning," in his *System of Surgery*, gives the following list of other affections caused by lightning: "Burns, more or less extensive; eruptions of erythema or of urticaria, which are said by one author to have reappeared with each succeeding thunder-storm; loss of hair over parts or the whole of the body; wounds; hemorrhage from the mouth, nose, or ears; loss of sight, smell, speech, hearing, and taste; or, in rare cases, exaltation of these special senses; cataract, imbecility, abortion." Another curious effect of lightning is that described under the head of LIGHTNING-PRINTS. In reference to the occasional loss of hair, M. Boudin (*op. cit.*) relates that the capt. of a French frigate, who was struck by lightning on board his ship, could not shave himself on the following day, the razor not cutting but tearing out his hair. From that day the beard disappeared, and the hair of the scalp, eyebrows, etc., gradually fell off, leaving him entirely bald. The nails of the fingers also scaled away. Sir B. Brodie tells a curious story of two bullocks, pied white and red, which were struck in different storms; in both cases the white hairs were consumed, while the red ones escaped. As a general rule, it seems that persons not killed on the spot usually recover. The burns present every degree of intensity; in some (probably exaggerated) cases we hear of men and animals being reduced to ashes, while in ordinary cases they vary from deep burns, difficult in healing, to mere vesications: they must be treated in the ordinary method. It was believed until recently that the burns are caused by the ignition of the clothes; it appears, however, from various cases collected by Dr. Taylor (*Med. Jurisp.*, 1865, p. 737), that burns, at all events in some cases, are the direct result of the electricity. One case is so singular that we shall give a few details regarding it. Mr. Fisher of Dudley was called in to see a man who 16 hours previously had been struck by lightning while milking a cow. The cow was killed on the spot, and the man was much injured, there being a severe burn extending from his right hip to his shoulder, and covering a large portion of the front and side of the body. His mind was wandering; there were symptoms of inflammatory fever, and he was confined to bed for 17 days, at the end of which time the healing process was not complete. On examining his dress, it was found that the right sleeve of his shirt was burned to shreds, but there was no material burning of any other part of his dress. Hence it is obvious that the dress may be burned without the surface of the body being simultaneously injured; and, further, that a serious burn may be produced on the body although the clothes covering the part may have escaped combustion.

The appearances after death vary extremely. The body sometimes retains the position which it occupied when struck, while in other cases it may be dashed to a considerable distance. The clothes are often burned or torn, and have a peculiar singed smell; and metallic substances about the person present signs of fusion, while such as are composed of steel become magnetic. There are generally marks of contusion or

laceration, or, if they are absent, extreme ecchymosis (q.v.) at the spot where the current entered or emerged. In addition to wounds and burns, fractures have also been noticed.

The treatment must be directed to the special symptoms, which are liable to great variations. Sir B. Brodie's advice is as follows: "Expose the body to a moderate warmth, so as to prevent the loss of animal heat to which it is always liable when the functions of the brain are suspended or impaired, and inflate the lungs, so as to imitate natural respiration as nearly as possible." These means should be fully tried, as respiratory action has been restored after more than an hour's suspension. Mr. Holmes additionally recommends cold affusion, stimulating enemata, and stimulants by the mouth; and recovery (he states) is apparently hastened by the administration of tonics, especially quinine, and gentle action on the skin by means of baths.

LIGHTNING-CONDUCTOR (Fr. *paratonnerre*, Ger. *Blitzableiter*). The principle of the lightning-conductor is that electricity, of two conducting passages, selects the better; and that when it has got a sufficient conducting passage, it is disarmed of all destructive energy. If a person holds his hand near the prime conductor of a powerful electric machine in action, he receives long forked stinging sparks, each of which causes a very sensible convulsion in his frame. But if he holds in his hand a ball, connected with the ground by a wire or chain, the above sensation is scarcely, if at all, felt as each spark occurs, for the electricity, now having the ball and wire passage to the ground, prefers it to the less conducting body. If, instead of a ball, a pointed rod were used, no sparks would pass, and no sensation whatever would be felt. The point silently discharges the prime conductor, and does not allow the electricity to accumulate in it so as to produce a spark; and the quantity passing at a time, even supposing the rod disconnected with the ground, is not sufficient to affect the nerves. If for the prime conductor of the machine we substitute the thunder-clouds; for the body, a building; for the convulsive sensation, as the evidence of electric power, heating and other destructive effects; for the ball, or rod, and wire, the lightning-conductor, we have the same conditions exhibited on a larger natural scale. It is easier, however, to protect a building from the attacks of lightning than the body from the electric spark, as the rod in the one case is a much better conductor, compared with the building, than it is compared with the body, and, in consequence, more easily diverts the electricity into it.

The lightning-conductor consists of three parts: the rod, or part overtopping the building; the conductor, or part connecting the rod with the ground; and the part in the ground. The rod is made of a pyramidal or conical form (the latter being preferable), from 8 to 30 ft. in height, securely fixed to the roof or highest part of the building. Gay-Lussac proposes that this rod should consist, for the greater part of its length below, of iron; that it should then be surmounted by a short sharp cone of brass; and that it should finally end in a fine platinum needle, the whole being riveted or soldered together, so as to render perfect the conducting connection of the parts. The difficulty of constructing such a rod has led generally to the adoption of simple rods of iron or copper, whose points are gilt, to keep them from becoming blunt by oxidation. It is of the utmost importance that the upper extremity of the rod should end in a sharp point, because the sharper the point the more is the electrical action of the conductor limited to the point and diverted from the rest of the conductor. There is thus less danger of the electricity sparking from the conductor at the side of the building into the building itself. Were the quantity of the electricity of the clouds not so enormous, the pointed rod would prevent a lightning-discharge altogether; but even as it is, the violence of the lightning-discharge is considerably lessened by the silent discharging power of the point previously taking place. According to Eisenlohr, a conical rod, 8 ft. in height, ought to have a diameter at its base of 13.3 lines, and one of 30 ft. a diameter of 26.6 lines.

The part of the lightning-conductor forming the connection between the rod and the ground is generally a prismatic or cylindrical rod of iron (the latter being preferable), or a strap of copper; sometimes a rope of iron or copper wire is used. Iron wire improves as a conductor when electric currents pass through it; copper wire, in the same circumstances, becomes brittle. An iron rope is much better, therefore, for conducting than a copper one. Galvanized iron is, of all materials, the best for conductors. The conducting-rod ought to be properly connected with the conical rod either by riveting or soldering or both. Here, as at every point of juncture, the utmost care must be taken that there is no break in the conduction. The conducting-rod is led along the roof and down the outside of the walls, and is kept in its position by holdfasts fixed in the building. There must be no sharp turns in it, but each bend must be made as round as possible. Considerable discussion has arisen as to the proper thickness for the conducting-rod. If it were too small it would only conduct part of the electricity, and leave the building to conduct the rest, and it might be melted by the electricity endeavoring to force a passage through it as an insufficient conductor. The Paris commission, which sat in 1823, gave the minimum section of an iron conductor as a square of 15 millimeters (about three-fifths of an inch) in side, and this they considered quite sufficient in all circumstances. A rod of copper would need to be only two-fifths of this, as copper conducts electricity about six times more readily than iron. This calculation is very generally followed in practice. In leading the conductor along the building it

should be kept as much apart as possible from masses of conducting matter about the building, such as iron beams, machinery, etc. These may form a broken chain of conductors communicating with the ground, and divert a portion of the electricity from the lightning-conductor. If such took place, then at each interruption electricity would pass in a visible and dangerous way, and the efficacy of the conductor would be lost. If the conductor cannot be properly insulated from these masses of metal, the necessary security is got by putting them in connection with the conductor, so as to form a part of it. Water-runs, leaden roofs, and the like, must, for this reason, all be placed in conducting connection with the conductor.

The portion of the lightning-conductor which is placed in the ground is no less worthy of attention than the other two. Should the lower part of the conductor end in dry earth, it is worse than useless, for when the lightning, attracted by the prominence and point of the upper rod, strikes it, it finds, in all likelihood, no passage through the unconducting dry earth, and, in consequence, strikes off to a part of the ground where it may easily disperse itself and be lost. Wherever it is practicable, a lightning-conductor should end in a well or large body of water. Water is a good conductor, and having various ramifications in the soil, offers the best facility to the electricity to become dispersed and harmless in the ground. The rod on reaching the ground should be let down a foot and a half, or 2 ft., into the soil, and then turned away at right angles to the wall from the building in a horizontal drain filled with charcoal, for about from 12 to 16 ft., and then turned into the well so far that its termination is little likely to be left dry. Where a well cannot be made, a hole 6 in. wide (wider, if possible) should be bored, from 9 to 16 ft., the rod placed in the middle of it, and the intervening space closely packed with freshly heated charcoal. The charcoal serves the double purpose of keeping the iron from rusting, and of leading away the electricity from the rod into the ground.

Lightning-conductors, when constructed with care, have been proved beyond a doubt to be a sufficient protection from the ravages of lightning. The circle within which a lightning-conductor is found to be efficacious is very limited. Its radius is generally assumed to be twice the height of the rod. On large buildings, it is therefore necessary to have several rods, one on each prominent part of the building, all being connected so as to form one conducting system. In ships, a rod is placed on every mast, and their connection with the sea is established by strips of copper inlaid in the masts, and attached below to the metal of or about the keel.

LIGHTNING-PRINTS are appearances sometimes found on the skin or clothing of men or animals that are either struck by lightning, or are in the vicinity of the stroke, and currently believed to be photographic representations of surrounding objects or scenery. The existence of such prints appears, from a theoretical point of view, highly improbable, as the essential conditions of forming a photographic image are wanting; still, several apparently well-authenticated instances have been recorded, which have led scientific authorities to give at least partial credence to them. One or two instances may serve to give a general idea of what are meant by lightning-prints. At Candelaria (Cuba), in 1828, a young man was struck dead by lightning near a house, on one of the windows of which was nailed a horse-shoe; and the image of the horse-shoe was said to be distinctly printed upon the neck of the young man beneath the right ear. On Nov. 14, 1830, lightning struck the château of Benatonnière, in La Vendée; at the time, a lady happened to be seated on a chair in the saloon, and on the back of her dress were printed minutely the ornaments on the back of the chair. In Sept., 1857, a peasant-girl, while herding a cow in the department of Seine-et-Marne, was overtaken by a thunder-storm. She took refuge under a tree; and the tree, the cow, and herself were struck with lightning. The cow was killed, but she recovered, and on loosening her dress for the sake of respiring freely, she saw a picture of the cow upon her breast. These anecdotes are typical of a great mass of others. They tell of metallic objects printed on the skin; of clothes, while being worn, receiving impressions of neighboring objects; or of the skin being pictured with surrounding scenery or objects, during thunder-storms. One object very generally spoken of as being printed is a neighboring tree. This may be accounted for by supposing that the lightning-discharge has taken place on the skin in the form of the electric brush (see ELECTRICITY), which has the strongest possible resemblance to a tree, and that this, being in some way or other imprinted on the skin, has led observers to confound it with a neighboring tree. Of other prints, it would be difficult to give a satisfactory account. However, observers have done something in imitation of them. It has been shown, for instance, by German observers, that when a coin is placed on glass, and a stream of sparks poured on it from a powerful electrical machine, on the glass being breathed upon, after its removal, a distinct image of the coin is traced out by the dew of the breath. Mr. Tomlinson, by interposing a pane of glass between the knob of a charged Leyden jar and that of the discharging-tongs, obtained a perfect *breath-figure* of the discharge on each side of the glass, which bore the most striking resemblance to a tree. With all due allowance for the probable printing-power of lightning, the accounts given of it, in most cases, bear the stamp of exaggeration; and such of them as have been inquired into have been found to dwindle to a very small residuum of fact, in which there remained little that was wonderful.

LIGHTS, USE OF, IN PUBLIC WORSHIP, a practice which prevailed in the Jewish (Exodus xxv. 31–39) and in most of the ancient religions, and which is retained both in the Roman and in the oriental churches. The use of lights in the night-services, and in subterranean churches, such as those of the early Christians in the catacombs, is of course easily intelligible; but the practice, as bearing also a symbolical allusion to the "Light of the world" and to the "Light of faith" was not confined to occasions of necessity, but appears to have been from an early time an accompaniment of Christian worship, especially in connection with the sacraments of baptism and the eucharist. The time of the service in which lights are used has varied very much in different ages. St. Jerome speaks of it only during the reading of the gospel; Amalarius, from the beginning of the mass till the end of the gospel; Isidore of Seville, from the gospel to the end of the canon; and eventually it was extended to the entire time of the mass. In other services, also, lights have been used from an early period. Lighted tapers were placed in the hand of the newly-baptized, which St. Gregory Nazianzen interprets as emblems of future glory. Indeed, in the Roman Catholic church, the most profuse use of lights is reserved for the services connected with that sacrament. The usage of blessing the paschal light is described elsewhere. See HOLY WEEK. The material used for lights in churches is either oil or wax, the latter in penitential time and in services for the dead being of a yellow color. In the Anglican church, candlesticks and, in some instances, candles themselves are retained in many churches on the communion table, but they are not lighted. The retention of them is greatly favored by the "high church" party, and much disapproved by the "low church" or "evangelical" party. In the Presbyterian and Independent churches of Britain, America, etc., the symbolical use of lights and candlesticks is rejected as superstitious.

LIGNE, CHARLES JOSEPH, Prince de, 1735–1814; b. in Brussels, and descended from a wealthy and powerful Belgian family; entered the Austrian army in 1752, where he served with distinction through the seven years' war. In the reign of Joseph II. he held high military and diplomatic positions, and was a great favorite in all the European courts. During the reign of Leopold he fell into disgrace, owing largely, no doubt, to his son's participation in the Belgian insurrection of 1790, after which event he was never again in the public service, but lived in retirement at Vienna, employing himself in literary pursuits. Of his miscellaneous works in 34 volumes, which appeared in 1795–1811, Malte Brun has given selections in 2 volumes. His memoirs and letters have considerable historic value.

LIG'NINE (derived from the Latin word *lignum*, wood) is the incrusting matter contained within the cellular tissue, which gives hardness to wood. Like cellulose, of which the cellular tissue is composed, it is insoluble in water, alcohol, ether, and dilute acids, and its chief chemical characteristic is, that it is more readily soluble in alkaline liquids than cellulose. Its exact composition is uncertain, but it is known to consist of carbon, hydrogen, and oxygen, and to differ in its composition from cellulose in containing a greater percentage of hydrogen than is necessary to form water with its oxygen. When submitted to destructive distillation, it yields acetic acid; and that it is the source of the pyroligneous acid (which is merely crude acetic acid) obtained by the destructive distillation of wood, is proved by the fact that the hardest woods (those, namely, which contain the greatest proportion of lignine) yield the largest amount of acid. Lignine is identical with the *matière incrustante* of Payen and other French botanists.

LIGNITE, fossil wood imperfectly mineralized, and retaining its original form and structure much more completely than the truly mineral *coals*, and therefore not improperly described as intermediate between peat and coal. *Brown coal*, *surturbrand*, and *jet* are generally regarded as varieties of lignite. The fossil plants of lignite are always terrestrial; palms and coniferous trees are amongst them. Remains of terrestrial mammalia are also found in it.

LIGNITE (*ante*), named from *lignum*, wood, a kind of coal, resembling, probably the condition of hard coal when in a state of transition or process of manufacture. It has no definite chemical composition. Some beds present a decidedly ligneous structure in the upper layers, and a true coal character below. When wood is buried in water or earth, it decomposes by the slow process of oxidation, or eremacausis, with the formation of carbureted hydrogen, carbonic acid, carbonic oxide, water, petroleum, etc., after a time leaving a denser, darker substance. After a long time it becomes black and exhibits a pitchy, somewhat conchoidal fracture. It is then lignite. This kind of coal is chiefly found in the cretaceous and tertiary formations, and in some localities forms immense beds, equal, perhaps, in extent to the beds of the carboniferous period. Lignite occupies an intermediate position between peat and hard and bituminous coal, and in favorable conditions in the process of ages peat will become lignite, and the latter will be converted into bituminous coal or anthracite. It is probable that most of the coal in China and India is more or less lignitic in its nature, as is the case of that of western America. Lignite is found also in Greenland and arctic America, and also in Central and South America. In Europe lignites have been mined for a long time, and are used not only for heating dwellings and other domestic purposes, but for generating steam in locomotives and furnaces. The following

analyses indicate the variable composition of lignite. One specimen from France contained, in round numbers, the following proportion of constituents: Carbon, 70; hydrogen, 6; oxygen, 18; nitrogen, 1; ashes, 5. Another specimen, also from France, contained, carbon, 64; hydrogen, 4.6; oxygen, 17; nitrogen 1; ashes, 13.4. Another specimen from Switzerland contained, carbon, 70; hydrogen, 5; oxygen, 20.5; nitrogen, 1.3; ashes, 3.2. Another specimen from Siberia contained, carbon, 47.5; hydrogen, 4.5; oxygen, 32; nitrogen, 1; ashes, 15. Another specimen from Germany contained, carbon, 70; hydrogen, 3.2; oxygen, 7.6; nitrogen, 1; ashes, 15.5. The last specimen shows a considerably less proportion of oxygen than the others, but that of carbon is scarcely greater than in the other specimens. It is to be presumed that its heating power does not differ much from theirs. The principal deposits of lignite in the United States are in New Mexico, Colorado, Utah, Nevada, California, Oregon, Wyoming, and Alaska. In New Mexico the beds are all in the cretaceous formation, and chiefly in the lower portion. In Colorado and Wyoming the beds occupy a space not less than 50,000 sq.m., the strata varying in thickness from 1 to 30 feet. Many of these lignites are now mined in Colorado, and they resemble in quality the best brown coals of the old world. Some lignites, as in Trinidad, and in Utah, near Salt Lake City, are capable of being coked and used in smelting. The lignites of California are cretaceous, and many of them find their way to San Francisco. On the coast of Oregon the lignites belong to the tertiary period, and have been mined for several years. An analysis of a specimen of coal from Mount Diablo, Cal., by H. S. Munroe of the N. Y. school of mines, gave the following results: Carbon, 59.724; hydrogen, 5.078; oxygen, 15.697; nitrogen, 1.008; sulphur, 3.916; water, 8.940; ash, 5.637. A lignitic anthracite from Sonora gave, carbon, 84.103 hydrogen, 0.852; oxygen, 2.137; nitrogen, 2.80; sulphur, 0.229; water, 5.191; ash 7.204. This is evidently a superior coal, considered as a lignite. There are occasionally seams of lignite along the Atlantic coast in tertiary formations, mingled more or less with clay.

LIG'NUM RHO'DIUM, a kind of wood which occurs as an article of commerce, having a pleasant smell resembling the smell of roses. It is brought to Europe in strong, thick, and rather heavy pieces, which are cylindrical but knotty, and sometimes split. They are externally covered with a cracked gray bark; internally, they are yellowish, and often reddish in the heart. They have an aromatic bitterish taste, and, when rubbed, emit an agreeable rose-like smell. This wood comes from the Canary islands, and is produced by two shrubby and erect species of *convolvulus*, with small leaves, *C. scoparius* and *C. floridus*. It is the wood both of the root and of the stem, but the latter is rather inferior. An essential oil (*oil of lignum rhodium*), having a strong smell, is obtained from it by distillation, and is used for salves, embrocations, etc., and also very frequently for adulteration of oil of roses.—Besides this lignum rhodium of the Canary islands, an American kind is also a common article of commerce; it is produced by the *amyris balsamifera*, a native of Jamaica, and yields an essential oil, very similar to the former. The lignum rhodium of the Levant is now scarcely to be met with in commerce. It is the produce of *liquidambar orientale*. From this, however, the name has been transferred to the other kinds.

LIG'NUM-VI'TÆ, the wood of *guaiacum officinale* (nat. ord. *zygophyllaceæ*), and probably of some other species, natives of Jamaica and St. Domingo. The hardness and exceeding toughness of this very useful wood was shown by prof. Voigt to depend upon a very peculiar interlacing of the fibers. The heart-wood, which is the part used, is very dense and heavy, of a dark, greenish-brown color, rarely more than 8 in. in diameter; the stem itself seldom reaches 18 in. in diameter, and grows to the height of about 30 feet. The wood is much valued for making the wheels of pulleys and other small articles in which hardness and toughness are required; large quantities are consumed in making the sheaves (see PULLEY) of ships' blocks. Besides these uses, the wood, when reduced to fine shavings or raspings, the bark, and also a greenish resin which exudes from the stem, are much used in medicine, being regarded as having powerful anti-syphilitic and anti-rheumatic properties. See GUAIACUM.

LIG'NY, a village in Belgium, in the province of Namur, about 10 m. n.e. of Charleroi, famous on account of the battle fought here by the French, under Napoleon, and the Prussians under Blücher, June 16, 1815, the same day on which the French, under marshal Ney, were engaged with the British, under Wellington, at Quatre-Bras. Napoleon had formed a plan for overpowering his antagonists in detail ere they could concentrate their forces; and contrary to the expectations both of Wellington and Blücher, began his operations by assailing the Prussians. The battle took place in the afternoon. The possession of the villages of Ligny and St. Amand was hotly contested; but the Prussians were at last compelled to give way. The Prussians lost in this battle 12,000 men and 21 cannon; the French 7,000 men. A mistake prevented a corps of the French army, under Erlon, from taking the part assigned to it in the battle, and led to Ney's encountering the Belgians and British at Quatre-Bras (q.v.), instead of uniting his forces with those engaged against the Prussians at Ligny.

LIG'ULATE (Lat. *ligula*, a little tongue), a term used in botany to describe a corolla of one petal split on one side, and spread out in the form of a tongue or strap, toothed at the extremity. This form of corolla is very common in the *compositæ*, appearing in all

the florets of some, as the dandelion, and only in the florets of the *ray* of others, as the daisy and aster. The term, however, is of general application.

LIGULE. See GRASSES.

LIGUORI, ALFONZO MARIA DE, a saint of the Roman Catholic church, and founder of the order of Liguorians or Redemptorists. He was b. of a noble family at Naples, Sept. 27, 1696, and embraced the profession of the law, which, however, he suddenly relinquished for the purpose of devoting himself entirely to a religious life. He received priest's orders in 1725; and in 1732, in conjunction with twelve companions, founded the association which is now called by his name. See LIGUORIANS. In 1762 he was appointed bishop of Sant' Agata dei Goti, in the kingdom of Naples, and his life, as a bishop, is confessed by Protestant as well as Catholic historians to have been a model of the pastoral character; but, shrinking from the responsibilities of such an office, he resigned his see in 1775, after which date he returned to his order, and continued to live in the same simple austerity which had characterized his early life. Having survived his retirement twelve years, he died at Nocera dei Pagani, Aug. 1, 1787, and was solemnly canonized in the Roman Catholic church in 1839. Liguori is one of the most voluminous and most popular of modern Catholic theological writers. His works, which extend to 70 volumes 8vo, embrace almost every department of theological learning—divinity, casuistry, exegesis, history, canon law, hagiography, asceticism, and even poetry. His correspondence also is voluminous, but is almost entirely on spiritual subjects. The principles of casuistry explained by Liguori have been received with much favor in the modern Roman schools; and in that church his moral theology, which is a modification of the so-called "probabilistic system" of the age immediately before his own, is largely used in the direction of consciences. See PROBABILISM. It would be out of place here to enter into a discussion of the exceptions which have been taken to certain portions of it on the score of morality, whether in reference to the virtue of chastity or to that of justice and of veracity. These objections apply equally to most of the casuists, and have often been the subject of controversy. Liguori's *Theologia Moralis* (8 vols. 8vo) has been reprinted numberless times, as also most of his ascetic works. The most complete edition of his works (in Italian and Latin) is that of Monza, 70 volumes. They have been translated entire into French and German, and in great part into English, Spanish, Polish, and other European languages.

LIGUO'RIANS, called also REDEMPTORISTS, a congregation of missionary priests founded by Liguori in 1732, and approved by pope Benedict XIV. in 1759. Their object is the religious instruction of the people and the reform of public morality, by periodically visiting, preaching, and hearing confessions, with the consent and under the direction of the parish clergy. Their instructions are ordered to be of the plainest and most simple character, and their ministrations are entirely without pomp or ceremonial. The congregation was founded originally in Naples, but it afterwards extended to Germany and Switzerland. In the Austrian provinces they had several houses, and were by some represented as but establishments of the suppressed Jesuits under another name. Nothing, however, could be more different than the constitution and the objects of the two orders. Since the restoration, and especially since the revolution of 1830, the Liguorians have effected an entrance into France, and several houses of the congregation have been founded in England, Ireland, and America; but their place is in great measure occupied by the more active congregation of the Lazarist or Vincentian fathers, whose objects are substantially the same, and who are much more widely spread. See PAUL, VINCENT DE, and VINCENTIAN CONGREGATION.

LIGURIA (LIGURIAN REPUBLIC, *ante*), in ancient geography, a part of n. Italy. As defined in the time of Augustus it embraced the territory from the Ligurian sea across the maritime Alps to the Po in the n., and from the Varus in the w. to the Macra in the east. At a very early period the Ligures possessed a larger territory, extending far into Gaul, on the western side of the Rhone. Their origin is unknown, but they were a warlike and enterprising people. They were subjugated by the Romans about 125 B.C., Liguria forming the nucleus of the Roman province of Gaul.

LIGU'RIAN REPUBLIC, the name given to the republic of Genoa in 1797, when, in consequence of the conquests of Bonaparte in Italy, it was obliged to exchange its aristocratic for a democratic constitution. See GENOA. The name was chosen because the Genoese territory formed the principal part of ancient Liguria.

LILAC, *Syringa*, a genus of plants belonging to the natural order *oleaceæ*, and consisting of shrubs and small trees, with 4-cleft corolla, 2 stamens, and a 2-celled, 2-valvular capsule. The COMMON LILAC (*S. vulgaris*) is one of the most common ornamental shrubs cultivated in Europe and North America. It is a native of the n. of Persia, and was first brought to Vienna by Busbecq, the ambassador of Ferdinand I., to whom we also owe the introduction of the tulip into European gardens. From Vienna it soon spread, so that it is now to be found half wild in the hedges of some parts of Enrope. There are many varieties. The flowers grow in large conical panicles; are of a bluish "*lilac*" color, purple or white, and have a very delicious odor. The leaves are a favorite food of cantharides. The bitter extract of the unripe capsules has very marked tonic and febrifugal properties. The wood is fine-grained, and is used for inlaying,

turning, and the making of small articles. A fragrant oil can be obtained from it by distillation. The CHINESE LILAC (*S. Chinensis*) has larger flowers, but with less powerful odor, and the PERSIAN LILAC (*S. Persica*) has narrower leaves. Both are often planted in gardens and pleasure-grounds. There are several other species.

LIL'BURNE, JOHN, 1618–1657; a Protestant agitator of England. Imbibing opinions in opposition to the English church, at the age of 18 he went to Holland to procure the printing of a pamphlet against the bishops. This he aided to circulate secretly, was exposed to the authorities, tried in the court of the star-chamber, condemned in Feb., 1637, to receive 500 lashes, to be pilloried and confined in prison, fined £500, and required to give security for good behavior. His bold courage before the judges gave him the *sobriquet* of "Freeborn John." Given his liberty in 1640 he placed himself at the head of his sympathizers and demanded that lord Stratford should be arraigned. He was again arrested and taken before the house of lords; but such was the pressure of public opinion in his favor that the parliament ("long parliament") released him, and subsequently declared his punishment to have been illegal, barbarous, and tyrannical; and recompensed him for his imprisonment and injuries by a payment to him of £3,000. He joined the army of the parliament against Charles I., was taken prisoner, and would have been hung, had not the parliament's general, the duke of Essex, threatened to hang royalist prisoners in retaliation. He soon became dissatisfied with the Presbyterian leaders, and published charges and denunciations even against Cromwell. The latter procured his trial before a commission, by whom he was acquitted. Emboldened by this, he began a violent agitation against Cromwell, read in public a pamphlet entitled *England's New Chains*, and in consequence was committed to the Tower. Thence he poured out political pamphlets which gave him great popularity with the people. He was again brought to trial, but the pressure of popular opinion in his favor determined his acquittal. But Cromwell soon after secured his condemnation and banishment for a vicious attack on Kaslering. He then resided in Brussels and Amsterdam. After the dissolution of the "long parliament," he returned to England without permission, and Cromwell sought to imprison him in the Tower; but it ended in his remaining in England as a prisoner at large. Towards the close of his quarrelsome life he espoused the doctrines of the Friends, or Quakers. Judge Jenkins said of him: "Were John Lilburne the only man living on the earth, Lilburne would dispute with John, and John with Lilburne." An account of his trials, entitled *Truth's Victory over Tyrants*, was published in 1649.

LILIA'CEÆ, a natural order of endogenous plants, containing about 1200 known species. They are most numerous in the warmer parts of the temperate zones. They are mostly herbaceous plants, with bulbous or tuberous, sometimes fibrous, roots; rarely shrubs or trees. The shrubby and arborescent species are mostly tropical. The stem is simple, or branching towards the top, leafless or leafy. The leaves are simple, generally narrow, sometimes cylindrical, sometimes fistular. The flowers are generally large, with 6-cleft or 6-toothed perianth; and grow singly or in spikes, racemes, umbels, heads, or panicles. The stamens are six, opposite to the segments of the perianth; the pistil has a superior 3-celled, many-seeded ovary, and a single style. The fruit is succulent or capsular; the seeds packed one upon another in two rows. This order contains many of our finest garden, green-house, and hot-house flowers, as lilies, tulips, dog's-tooth violet, lily of the valley, tuberose, crown imperial, and other fritillaries, hyacinths, *gloriosa superba;* many species useful for food, as garlic, onion, leak, and other species of *allium*, asparagus, the quamash or biscuit root (*camassia esculenta*) of North America, the ti (*dracæna terminalis* or *cordyline ti*) of the South seas, etc.; many species valuable in medicine, as squill, aloes, etc.; and some valuable for the fiber which their leaves yield, as New Zealand flax, and the species of bowstring hemp or *sanseviera*.—This natural order has been the subject of a number of splendid works, among which may be particularly named Redoute's *Les Liliacées* (8 vols. Paris, 1802–16).

LILLE (formerly L'ISLE, "the island;" Flemish, *Ryssel*), an important manufacturing t. and fortress in the n. of France, chief town of the department of Nord, is situated on the Deule, in a level, fertile district, 140 m. n.n.e. of Paris, and 62 m. s.e. of Calais. The streets are wide, the squares imposing, and the houses, which are mostly in the modern style, well built. The principal buildings and institutions are the medical school, the lyceum, the bourse, and the palace of Richebourg, now the Hotel-de-Ville, in which is the school of art, with a famous collection of drawings by Raphael, Michael, and other masters. Lille derives its name from that of the castle around which the town originally arose, and which from its position in the midst of marshes was called Isla. It was founded in 1007 by Baldwin, the fourth count of Flanders, and has suffered greatly from frequent sieges. Of these, the most recent, and perhaps the most severe, took place in 1708 and 1792. On the former occasion, during the war of the Spanish succession, the garrison capitulated to the allies, after a bombardment of 120 days; on the latter, the Austrians, after a terrific bombardment, were obliged to raise the siege. Lille is an important military center. It is also the seat of extensive and thriving manufactures. The goods principally manufactured are linen, hosiery, gloves, blankets, lace, *Lille* thread, and tulle. The town contains many spinning-mills, bleach-fields, sugar-

refineries, distilleries, tan-pits, dye-houses, etc. In the vicinity are numerous oil-mills, porcelain-factories, and glass and pottery works. Pop. '76, 137,560.

LILLEBONNE, a small t. of northern France on the river Bolbec, 40 kilometers e. of Havre; pop. 4,800; has manufactures of thread, cotton, and linen fabrics. William the conqueror gave it importance by the construction there of a *château-fort*. Old Roman roads diverge from it to Rouen, Paris, Evreux, and Dreux. It was a city of importance under the Romans, as attested by considerable ruins, among which are those of a theater 340 ft. long.

LILLERS, a small t. in the n. of France on the river Mare; pop. 6,600. Principal industries, the manufacture of shoes for exportation, of linens, and of beer and distilled liquors.

LILLIBURLERO, the refrain of an Irish ballad, which appeared before the revolution of 1688, and is said to have exercised a profound influence, going far to precipitate that outbreak. The words "lilliburlero and bullen-a-lah" (Irish) are said to have been employed by the Irish Roman Catholics during the Protestant massacres of 1641. The ballad in question, alleged to have been written by lord Wharton, took up these words and employed them to fire the hearts of the king's soldiers.

LIL'LIPUT, the name of a fabulous kingdom described by Swift in *Gulliver's Travels*, of which the inhabitants are not greater in size than an ordinary man's finger. The term Lilliputian has come into common use as a designation of anything very diminutive.

LIL'LO, GEORGE, 1693–1739; an English dramatist of vigorous style and of a moral tendency in advance of his time; the representative of the domestic manners and tastes of the middle classes. His plays of *Silvia* and *George Barnwell* both appeared in 1731. The latter was extremely popular, and greatly delighted queen Caroline. It was imitated by Saurin and played in France under the title of *Beverly*. His other works are the *Christian Hero; Marina;* and *Elmerick*. These works were collected and published in 2 vols. 12mo. in 1772.

LILLY, JOHN. See LYLY, *ante*.

LILLY, WILLIAM, an English astrologer, b. at Diseworth, in Leicestershire, in 1602. Whilst yet a young man, he was employed as book-keeper by a merchant in London, who could not write, and on his employer's death married his widow, with whom he obtained a fortune of £1000 sterling. He betook himself to the study of astrology, particularly the *Ars Notoria* of Cornelius Agrippa, and soon acquired a considerable fame as a caster of nativities, and a predictor of future events. In 1634 he is said to have obtained permission from the dean of Westminster to search for hidden treasure in Westminster abbey, but was driven from his midnight work by a storm, which he ascribed to hellish powers. From 1644 till his death he annually issued his *Merlinus Anglicus Junior*, containing vaticinations, to which no small importance was attached by many. In the civil war he attached himself to the parliamentary party, and was actually sent in 1648, with another astrologer, to the camp at Colchester, to encourage the troops, which service he performed so well that he received a pension for it, which, however, he only retained two years. Nevertheless, he made a small fortune by his "art" during the commonwealth, and was able to purchase an estate. After the restoration, he was for some time imprisoned, on the supposition that he was acquainted with the secrets of the republicans; but being set free, he retired to the country. He was again apprehended on suspicion of knowing something of the causes of the great fire of London in 1666. He died June 9, 1681, at his estate at Hersham. Lilly wrote nearly a score of works on his favorite subject. They are of no value whatever, except to illustrate the credulity or knavery of their author.

LILY, a genus of plants of the natural order *liliaceæ*, containing a number of species much prized for the size and beauty of their flowers. The perianth is bell-shaped, and its segments are often bent back at the extremity. The root is a scaly bulb, the stem herbaceous and simple, often several feet high, bearing the flowers near its summit.—The WHITE LILY (*L. candidum*), a native of the Levant, has been long cultivated in gardens, and much sung by poets. It has large, erect, pure white flowers, as much prized for their fragrance as for their beauty.—The orange lily (*L. bulbiferum*), a native of the s. of Europe, with large, erect, orange-colored flowers, is a well-known and very showy ornament of the flower-garden.—The martagon or Turk's cup lily (*L. martagon*), a native of the s. of Europe, and allied species with verticillate leaves and drooping flowers, are also common in gardens. The tiger lily (*L. tigrinum*) is a native of China, remarkable for the axillary buds on the stem; and some very fine species are natives of North America, as *L. superbum*, which grows in marshes in the United States, has a stem 6 to 8 ft. high, and reflexed orange flowers, spotted with black; *L. Canadense*, etc. Several very fine species have been introduced from Japan, as *L. Japonicum*, *L. speciosum*, and *L. lancifolium*.—The bulbs of *L. pomponium*, *L. martagon*, and *L. Kamtschacense*, are roasted and eaten in Siberia. That of *L. candidum* loses its acridity by drying, roasting, or boiling; when cooked, it is viscid, pulpy, and sugary, and is eaten in some parts of the east.—Lilies are generally propagated by offset bulbs. A single scale of the bulb will, however, suffice to produce a new plant, or even part of a scale, of

which skillful gardeners avail themselves.—The name lily is often popularly extended to flowers of other genera of the same order, and even of allied orders.

LILY, GIGANTIC, *Doryanthes excelsa*, of Australia, a plant of the natural order *amaryllideæ*, with flowering stem 10 or 14, sometimes 20 ft. high, bearing at top a cluster of large crimson blossoms. The stem is leafy, but the largest leaves are near the root. This plant is found both on the mountains and the sea-coast of New South Wales. It is of splendid beauty. The fiber of its leaves has been found excellent for ropes and for textile fabrics.

LILYBÆ'UM. See MARSALA, *ante.*

LILYE, or LILLY, WILLIAM, 1466–1523; a celebrated English grammarian; graduated at Oxford, and immediately afterwards traveled in the orient to perfect his knowledge of the Greek language. He passed five years at the ancient city of Rhodes, then resided in Rome, and returned to London in 1509. There he opened the first public school for teaching the dead languages. He became, soon after, the first master of St. Paul's school, and in the intervals of his duties edited and published a work known as *Lilly's Grammar;* to which dean Colet, the great Erasmus, and cardinal Wolsey each contributed a part. It was a quarto volume, published in London in 1513, and is said to have passed through more editions than any similar work.

LILY OF THE VALLEY, *Convallaria*, a genus of plants of the natural order *liliaceæ*, having terminal racemes of flowers; a white, bell-shaped, or tubular 6-cleft or 6-toothed perianth; a 3-celled germen, with two ovules in each cell, and a succulent fruit.—The species commonly known as the lily of the valley (*C. majalis*), the *Maiblume* or May-flower of the Germans, grows in bushy places and woods in Europe, the north of Asia, and North America, and has a leafless scape, with a raceme of small flowers turned to one side. It is a universal favorite on account of its pleasing appearance, the fragrance of its flowers, and the early season at which they appear. It is therefore very often cultivated in gardens, and *forced* to earlier flowering in hot-houses. Varieties are in cultivation with red, variegated, and double flowers. The berries, the root, and the flowers have a nauseous, bitter, and somewhat acrid taste, and purgative and diuretic effects. The smell of the flowers, when in large quantity and in a close apartment, is narcotic. Dried and powdered they become a sternutatory. The esteemed *eau d'or* of the French is a water distilled from the flowers.—Allied to lily of the valley is Solomon's seal (q.v.).

LI'MA, the capital of the republic of Peru, stands on the Rimac, from whose name its own is corrupted, in lat. 12° 3′ s., and long. 77° 5′ west. It is 6 m. distant from its port, on the Pacific, Callao, with which it is connected by a railway. Including its suburban villages, ten in number, it contains ('76) 100,073 inhabitants. Lima is of Spanish origin, and its generally magnificent public buildings entitle it to rank as the handsomest city of South America. At one time the grand *entrepôt* for the west coast of the continent, it still carries on a large trade, importing cottons, woolens, silks, hardware, wines, and brandy; and exporting silver, copper, bark, soap, vicuna wool, chinchilla skins, niter, sugar, etc. The temperature is agreeable, averaging 68.1° in winter and 77.6° in summer; and the climate is comparatively salubrious, abundant dews making up for the want of rain.

LIMA (*ante*). The approaches to the city are by six gates; and the principal alameda, an avenue of great beauty on the road to Callao, is one of the most striking and impressive thoroughfares on the continent. The general impression made by the city on nearing it is more in its favor than on a closer examination. At a distance, its spires and domes glitter in the sun, and its architecture, Moorish in character, gives it a very picturesque appearance. But, excepting the public buildings, the houses are low, and irregularly built, though the streets are regular and attractive. The plaza mayor, or great square, has a handsome fountain in the center, and is the principal business locality. Here are the palace of the president of Peru, the cathedral, and the archbishop's palace; the old palace of Pizarro is on the south side, and on the west is the town-hall. An immense amphitheater for bull-fighting is a feature of one of the alamedas. The longest side of the city, which is in the form of a triangle, extends along the bank of the river Rimac. Through the middle of almost every street a stream of water is turned each morning, designed to carry away whatever refuse collects from the houses; and this process, combined with the service of the buzzards, comprises the public scavengering of the city. The monasteries and convents of Lima, of which there were at one time a large number, have nearly all been suppressed. The convent of San Francisco, however, is a large monastic establishment, covering nearly seven acres of ground: there are also many parish churches and 22 chapels. The university of Lima was the first educational establishment of the kind in the new world. It has fallen into decay to some extent, but contains a valuable library of about 20,000 volumes. Lima was founded by Pizarro in 1535, and called Ciudad de los Reyes. It has been frequently visited by earthquakes, one of which, in 1746, destroyed many buildings. The city has recently (Jan., 1881) been captured by the Chilian forces in the process of the lamentable war between Peru and Chili.

LIMA WOOD, a name of the dye-wood also called Pernambuco wood, Nicaragua wood, and peach wood, the heart-wood of *Cæsalpinia echinata*. See BRAZIL WOOD. It is extensively used for dyeing red and peach-color.

LIMAX and **LIMACIDAE**. See SLUG.

LIMB, the border or edge of the disk of a heavenly body, particularly the sun and moon. The name is applied to the graduated circle of an instrument for measuring angles. A concentric arc used for subdividing the spaces or degrees on the limb, is called a vernier. There are two limbs on a theodolite, one for measuring horizontal and another for measuring vertical angles, called respectively the horizontal and the vertical limb. The graduated staff of a leveling rod is often called a limb, the graduated line on the vane being called the vernier.

LIMBER is half the field-equipage of a cannon or howitzer. The one half consists of the carriage itself, with the gun; while the limber, a two-wheeled carriage, fitted with boxes for the field-ammunition of the piece, and having shafts to which the horses are harnessed, forms the remainder. At the back-part, the limber has a strong hook, to which, on the march, is attached the foot of the gun-carriage by a ring. This constitutes at once a four-wheeled frame, which, while easier for transport than a gun on two wheels only, has the advantage of keeping together the gun and its ammunition. In marching, the gun points to the rear; but in coming to action, the artillerymen, by a rapid evolution, wheel round, so that the gun points to the front. It is then *unlimbered*, or unhooked, and the limber conveyed far enough to the rear to be out of the way of the men working the piece. To *limber up* again and retreat or pursue is the work but of a few moments.

LIMBO. See LIMBUS, *ante*.

LIM'BORCH, PHILIPPUS VAN, 1633–1712; b. Amsterdam; was educated in theology, and in 1657 made minister at Gonda, and ten years later professor of theology at the Remonstrant college of Amsterdam. He was a careful student of the doctrines of Arminius, and wrote *Theologia Christiana*, an elaborate and profound analysis of them, published 1686 and highly praised by Hallam. He was in frequent correspondence with John Locke.

LIM'BURG, an old province of Belgium, which, after having formed part of Belgium, France, Holland, and Austria, was, in 1839, divided between Belgium and Holland.—BELGIAN LIMBURG, or LIMBOURG, in the n.e. of the kingdom, is separated from Holland by the Meuse up to lat. 51° 9′ n., and thence by a line running e.n.e. to the northern boundary of the kingdom. The surface of the province is flat, and a large portion of it is occupied by barren heath; but in the s. and center there is good arable land. There is excellent pasturage along the banks of the Meuse, and large herds of cattle and swine are here reared. The manufactures include soap, salt, pottery, paper, tobacco, straw-hats, beet-sugar, etc. The area of the province is 928 English sq.m., and the pop. '76, 206,187. The capital of the province is Hasselt (q.v.).

LIMBURG, a province of Holland, which was once also a duchy in the Germanic confederation, forms the s.e. corner of the kingdom, being contiguous to the Belgian province of the same name. Its surface is generally level, and the soil is poor, a great part of it consisting of moors and marshes. However, in the valleys of the Meuse and its chief tributaries, excellent crops of grain, hemp, flax, oil-seeds, etc., are raised, and cattle and sheep reared. There are many manufactories of gin, tobacco, soap, leather, paper, and glass. The capital is Maestricht (q.v.). Area, 848 English sq.m.; pop. '75, 232,562.

LIMBURG-ON-THE-LAHN. A t. in the duchy of Nassau annexed to Prussia in 1866; seat of the Catholic bishopric of Fribourg; pop. about 5,000. It is one of the most ancient cities of Germany. The "Chronicles of Limbourg," in one of its libraries, is one of the oldest and most important historical manuscripts of Europe. The cathedral of St. George, built in the 13th c. on a crag overlooking the valley of the river, is remarkable for its picturesqueness. Near this town the French gen. Jourdan was defeated by the Austrians in 1796.

LIM'BUS (Lat. *limbus*, a border), the name assigned in Roman Catholic theology to that place or condition of departed souls in which those are detained who have not offended by any personal act of their own, but, nevertheless, are not admitted to the divine vision. They distinguish it into the *limbus patrum* and the *limbus infantium*. By the former name they understand the place of those just who died before the coming of the Redeemer, and of whom it is said (1 Peter iii. 19) that he preached to those spirits that were in prison. By the latter is meant the place or state of the souls of infants who die without baptism. See HELL. Regarding the nature of both these places of detention, great variety of opinion prevails in Roman Catholic schools. See Wetser's *Kirchen-Lexicon*, art. "Höllenfahrt Christi."

LIME is the oxide of the metal calcium (q.v.), and is known in chemistry as one of the alkaline earths. Its symbol is CaO, its equivalent is 28, and its specific gravity is 3.18. In a state of purity it is a white caustic powder, with an alkaline reaction, and so infusible as to resist even the heat of the oxhydrogen jet. See DRUMMOND LIGHT. It

is obtained by heating pure carbonate of lime (as, for instance, Carrara marble or Iceland spar) to full redness, when the carbonic acid is expelled and lime is left. Commercial lime, which is obtained by burning common limestone in a kiln, is usually very far from pure. This compound (CaO) is known as *quicklime*, or, from the ordinary method of obtaining it, as *burned lime*, to distinguish it from the *hydrate of lime* or *slaked lime*, which is represented by the formula CaO,HO. On pouring water on quicklime, there is an augmentation of bulk, and the two enter into combination; and if the proportion of water be not too great, a light, white, dry powder is formed, and a great heat is evolved. On exposing the hydrate to a red heat, the water is expelled, and quicklime is left.

If quicklime, instead of being treated with water, is simply exposed to the air, it slowly attracts both aqueous vapor and carbonic acid, and becomes what is termed *air-slaked*, the resulting compound in this case being a powder which is a mixture (or possibly a combination) of carbonate and hydrate of lime.

Lime is about twice as soluble in cold as in boiling water, but even cold water only takes up about $\frac{1}{700}$ of its weight of lime. This solution is known as *lime-water*, and is much employed both as a medicine and as a test for carbonic acid, which instantly renders it turbid, in consequence of the carbonate of lime that is formed being more insoluble even than lime itself. It must, of course, be kept carefully guarded from the atmosphere, the carbonic acid of which would rapidly affect it. If, in the preparation of slaked lime, considerably more water is used than is necessary to form the hydrate, a white semi-fluid matter is produced, which is termed *milk of lime*. On allowing it to stand, there is a deposition of hydrate of lime, above which is lime-water.

The use of lime in the preparation of mortars and cements is described in the articles on these subjects. Lime is also largely employed as a manure (see below), and in the purification of coal-gas, in the preparation of hides for tanning, for various laboratory processes (from its power of attracting water), etc. Its medicinal uses are noticed below.

The following are the most important of the salts of lime. *Sulphate of lime* (CaO,SO_3) occurs free from water in the mineral *anhydrite*, but is much more abundant in combination with two equivalents of water in *selenite*, and in the different varieties of *gypsum* and *alabaster*. See GYPSUM.

Carbonate of lime (CaO,CO_2) is abundantly present in both the inorganic and organic kingdoms. In the inorganic kingdom it occurs in a crystalline form in Iceland spar, Aragonite, and marble—in which it is found in minute granular crystals—while in the amorphous condition it forms the different varieties of limestone, chalk, etc. It is always present in the ashes of plants, but here it is, at all events, in part the result of the combustion of citrates, acetates, malates, etc., of lime. It is the main constituent of the shells of crustaceans and mollusks, and occurs in considerable quantity in the bones of man and other vertebrates. Carbonate of lime, held in solution by free carbonic acid, is also present in most spring and river waters, and in sea-water. Stalactites, stalagmites, tufa, and travertin are all composed of this salt, deposited from calcareous waters. Certain forms of carbonate of lime—the Portland and other oolites, some of the magnesian limestones, etc.—are of extreme value for building purposes, and the various uses of the finer marbles (q.v.) are too well known to require comment.

There is a combination of lime with an organic acid, viz., oxalate of lime, which is of great importance in pathology as a frequent constituent of urinary calculi and sediments; for a description of it see OXALIC ACID.

The soluble salts of lime (or, more accurately speaking, of calcium) give no precipitate with ammonia, but yield a white precipitate (of carbonate of lime) with carbonate of potash or of soda. These reactions are, however, common to the salts of barium, strontium, and calcium. Solution of sulphate of lime produces no marked effect when added to a salt of calcium, but throws down a white sulphate with the other salts. The most delicate test for lime is oxalate of ammonia, which, even in very dilute neutral or alkaline solutions, throws down a white precipitate of oxalate of lime.

There are several compounds of phosphoric acid and lime, of which the most important is the *basic phosphate of lime*, sometimes termed *bone phosphate*, from its being the chief ingredient of bones. The basic phosphate is represented by the formula $3CaO,PO_5$, and not only occurs in bones, but also in the minerals apatite and phosphorite, and in the rounded nodules termed coprolites, which are found in the Norfolk crag. It forms four-fifths of the ash of well-burned bone, the remaining one-fifth being carbonate of lime. This ash is known as *bone-earth*, and is employed as a manure and in the preparation of phosphorus, etc.

The substance commonly designated as *chloride of lime* has been already described in the article BLEACHING POWDER.

Lime as Manure.—This mineral substance has been used for many centuries as a means of increasing the fertility of land. All crops require a certain amount, as is found by analyzing the ash which remains after combustion. It is sometimes supplied, without previous preparation, in the form of marl and chalk, but in most cases is first calcined and reduced to a fine powder by slaking with water. The quantity of calcined lime applied varies from three to eight tons to the acre. The smaller quantity may be sufficient for light land containing little vegetable matter, while the larger may be

required for strong land, or for land holding much organic matter in an inert state. The large quantity of lime applied shows that its manurial effect is due more to its producing a certain chemical effect on the land than to its affording nutriment to the crops. Lime promotes the decomposition of all kinds of vegetable matter in the soil, and, further, it corrects any acidity in the organic matter, and thus destroys those weeds which are favored by such a condition of the soil. It assists in the decomposition of certain salts whose bases form the food of plants, and in this way it may be said to digest or prepare their food. On certain kinds of land, the finer grasses do not thrive until the land has been limed, and in these cases its use becomes all-important. Lime is the only cure, too, that can be relied on for "finger-and-toe" in turnips, and its use is, from this cause, becoming more general.

Lime-Compounds in Materia Medica.—*Quicklime*, in association with potash, either as the *potassa cum calce*, or as *Vienna paste*, is occasionally used as a caustic. *Lime-water*, mixed with an equal quantity or an excess of milk, is one of our best remedies for the vomiting dependent on irritability of the stomach. From half an ounce to two or three ounces may be thus taken three or four times a day. Its use as a constituent of carron oil in burns is noticed in the article LINIMENTS. *Chalk*, or *carbonate of lime*, when freed from the impurities with which it is often associated, is used as a dusting-powder in moist excoriations, ulcers, etc.; and in the form of *chalk mixture* and *compound powder of chalk*, is a popular remedy in various forms of diarrhœa. A mixture of an ounce of precipitated carbonate of lime and a quarter of an ounce of finely powdered camphor, is sold as *camphorated cretaceous tooth-powder*.

LIME, *Citrus acida*, a fruit similar to the lemon (q.v.), but much smaller, being only about 1½ inches in diameter, and almost globular, with a thin rind, and an extremely acid juice. It is regarded by many botanists as a variety of the same species with the citron and lemon. The plant does not attain the magnitude of a tree, but is a shrub of about 8 ft. in height, with a crooked trunk, and many spreading prickly branches. It is a native of India and China, but has long been cultivated in the West Indies, the s. of Europe, etc. In the West Indies, it is planted both for the sake of its fruit and for hedges. The fruit is used for the same purposes as the lemon; but its acid is by many reckoned more agreeable. Lime-juice is imported into Britain like lemon-juice for the manufacture of citric acid, and it is itself used as a beverage.—The sweet lime (*C. limetta* of Risso), cultivated in the s. of Europe, appears to be a mere variety, probably the result of cultivation, with a sub-acid pulp.

LIME, or LINDEN, *Tilia*, a genus of trees of the natural order *tiliaceæ*, natives of Europe, the n. of Asia, and North America. The species are very similar; graceful, umbrageous trees; with deciduous, heart-shaped, serrated leaves, and cymes or panicles of rather small yellowish flowers; each cyme or panicle accompanied with a large, oblong, yellowish, membranous bractea, with netted veins, the lower part of which adheres to the flower-stalk. The wood is light and soft, but tough, durable, and particularly suitable for carved work. It is much used by turners, and for making pill-boxes. The charcoal made of it is often used for tooth-powder, for medicinal purposes, for crayons, and for the manufacture of gunpowder. The use of the fibrous inner bark for making ropes, mats, and other plaited work, is noticed in the article BAST. It is also used as a healing application to wounds and sores, being very mucilaginous, and abounding in a bland sap. The leaves are in some countries used as food for cattle, but cows fed on them produce bad butter. The flowers have an agreeable odor, and abound in honey, much sought after by bees. The celebrated *Kowno honey*, much valued for medicinal use and for making liqueurs, is the produce of great lime forests near Kowno, in Lithuania. The infusion and distilled water of the dried flowers are gently sudorific and antispasmodic. The former is in France a popular remedy for catarrhs. The seeds abound in a fixed sweet oil.—The EUROPEAN LIME, or LINDEN (*T. Europæa*), often attains a large size, particularly in rich alluvial soils. Some botanists distinguish a small-leaved kind (*T. parvifolia* or *microphylla*) and a large-leaved (*T. grandifolia*) as different species; others regard them as mere varieties. The HOODED or CAPUCHIN LIME is an interesting monstrous variety. The lime tree is often planted for shade in towns; and the principal street of Berlin is called *Unter den Linden*, from the rows of lime trees which line it. The lime is a very doubtful native of Britain, although indigenous on the continent from Scandinavia to the Mediterranean. In Britain, the lime tree is generally propagated by layers.—The AMERICAN LIME (*T. Americana*, or *T. glabra*), commonly called BASSWOOD in America, has larger leaves than the European species. It abounds on the shores of lakes Erie and Ontario. Other species take its place in more western and more southern regions.

LIM'ERICK, an inland co. of the province of Munster, in Ireland, separated by the Shannon on the n. from Clare, and bounded on the e. by Tipperary, on the s. by Cork, and on the w. by Kerry. Its extreme length is 35 m., its breadth 54 m.; area, 1064 sq.m., or 680,842 acres. Pop. '71, inclusive of the city of Limerick, 191,936; of whom 147,389 were Roman Catholics. The county returns two members to parliament. The surface of Limerick is an undulating plain, which forms part of the central carboniferous limestone plain of Ireland. A mountainous district on the w. belongs to the great coal-tract of Munster, but the coal is of an inferior quality, and is chiefly used for the

burning of lime. Within a short distance of the city of Limerick is a quarry which produces a reddish-brown marble of fine quality, as well as a black marble of inferior value. More than one of the districts contains iron, copper, and lead ores; but at present no mining operations are carried on. The soil in general is very fertile, especially the district called the Golden Vale, which comprises upwards of 150,000 acres; as also a portion of the left bank of the Shannon below Limerick. Of the entire acreage of the county, 526,876 acres are arable, and 121,101 unsuited to cultivation. In general the soil is equally fitted for tillage and for pasture. In 1876 172,941 acres were under crops of various kinds, only 858 being reported fallow. In the same year the number of cattle was 200,308; of sheep, 70,000; and of pigs, 66,180. The national schools in 1875 were attended by 37,444 pupils, of whom 36,682 were Roman Catholics.

The principal towns of Limerick are the city of that name, Newcastle, and Rathkeale. Of the secondary rivers, the Deel and the Maigue are the most important. The great highway of water-communication, however, is the Shannon itself, the navigation of which has been much improved, and in which the harbor of Foynes promises to form the nucleus of an extended foreign trade. Limerick communicates by railway with Dublin, Waterford, Cork, and Ennis. The population is chiefly occupied in agriculture, hardly any manufactures existing outside the city. Limerick anciently formed part of the territory of Thomond, the principality of the O'Briens. After the English invasion, it fell, through many vicissitudes, in great part to the Desmond Fitzgeralds—the confiscated estates of the last earl in Limerick contained no fewer than 96,165 acres. On the forfeitures after 1641 and 1690, it was parceled out to new proprietors. Limerick is more than usually rich in antiquities, both ecclesiastical and civil, of the Celtic as well as of the Anglo-Norman period. There were at one time nearly 40 religious foundations of the O'Briens alone, and the ruins of about 100 castles are still in existence. The ecclesiastical remains of Adare are exceedingly interesting, two of the ancient churches having been restored, one as the Protestant, the other as the Catholic parish church. Two other monastic ruins, in very good preservation, form a group of ecclesiastical remains hardly surpassed, in number and picturesqueness, even in the most favored districts of England.

LIMERICK, city, capital of the county just described, is situated on the river Shannon, 120 m. w.s.w. from Dublin, with which it is connected by the great Southern and Western railway. Pop. in '51, 53,448; in '61, 44,626; in '71, 39,353, of whom 18,022 were males, and 21,331 females. More than 90 per cent were Roman Catholics. Limerick is a parliamentary and municipal borough, and returns two members to parliament. It occupies both sides of the Shannon, together with a tract called King's island, which lies on a bifurcation of the river; and is divided into the English town, the oldest part of the city (and connected with the extensive suburb called Thomond Gate, on the Clare side of the Shannon), and the Irish town, which, within the present century, has extended on the s. bank of the river into what is now the best part of Limerick, called the new town, or Newtown Pery, one of the handsomest towns in Ireland. Limerick is a place of great antiquity. From its position on the Shannon, it was long an object of desire to the Danes, who occupied it in the middle of the 9th c., and held possession till reduced to a tributary condition by Brian Boroimhe, in the end of the 10th century. It was early occupied by the English, and in 1210 king John visited and fortified it. It was afterwards assaulted and partially burned in 1314 by Edward Bruce. Its later history is still more interesting. It was occupied by the Catholic party in 1641, but surrendered to Ireton in 1651. At the revolution, it was the last stronghold of king James. Having been unsuccessfully besieged by William after the victory of the Boyne, it was regularly invested in 1691 by gen. Ginkel, and after a vigorous and brilliant defense of several weeks, an armistice was proposed, which led to the well-known "treaty of Limerick," the alleged violation of which has been the subject of frequent and acrimonious controversy between political parties in Ireland. The so-called "treaty stone" still marks the spot, near Thomond bridge, at the entrance of the suburb of Thomond Gate, where this treaty was signed. The modern city of Limerick is more tasteful in its general character, and possesses more of the appliances of commercial enterprise and social culture than most towns of Ireland. Its public buildings, especially the new Roman Catholic cathedral and church of the Redemptorist order, are imposing, and in excellent taste. Its charitable and religious establishments are truly munificent for a provincial town. It possesses several national schools, as well as many other educational institutions. The Shannon at Limerick is still a noble river, navigable for ships of large burden. The docks and quays are on a very extensive and commodious scale; and the export trade is conducted with considerable enterprise. The Wellesley bridge, over the harbor, cost £85,000. The inland navigation is by means of a canal to Killaloe, where it enters lough Derg, and thence by the upper Shannon to Athlone, and by the Grand canal, which issues from the Shannon at Shannon harbor, to Dublin. The manufactures of Limerick are not very extensive, but some of them enjoy not merely an Irish, but an imperial reputation—such are the manufactures of lace, of gloves, and of fish-hooks. There are several iron-foundries, flour-mills, breweries, distilleries, and tanneries, and of late years the ship-building trade has been extended. In 1875 576 vessels, of 138,456 tons, entered, and 354, of 88,811 tons cleared the port.

LIMESTONE, the popular as well as technical name for all rocks which are composed in whole, or to a large extent, of carbonate of lime. Few minerals are so extensively distributed in nature as this, and in some form or other, limestone rocks occur in every geological epoch. Carbonate of lime is nearly insoluble in pure water, but it is rendered easily soluble by the presence of carbonic acid gas, which occurs in a variable quantity in all natural waters, for it is absorbed by water in its passage through the air as well as through the earth. Carbonate of lime in solution is consequently found in all rivers, lakes, and seas. In evaporation, water and carbonic acid gas are given off, but the carbonate of lime remains uninfluenced, becoming gradually concentrated, until it has supersaturated the water, when a precipitation takes place. In this way are formed the stalactites which hang icicle-like from the roofs of limestone caverns, and the stalagmites which rise as columns from their floors. Travertine (Tiber-stone), or calcareous tufa, is similarly formed in running streams, lakes, and springs, by the deposition of the carbonate of lime on the beds or sides, where it incrusts and binds together shells, fragments of wood, leaves, stones, etc. So also birds' nests, wigs, and other objects become coated with lime in the so-called petrifying wells, as that at Knaresborough. From the same cause, pipes conveying water from boilers and mines often become choked up, and the tea-kettle gets lined with "fur."

While water is thus the great store-house of carbonate of lime, very little of it, however, is fixed by precipitation, for in the ocean evaporation does not take place to such an extent as to permit it to deposit, besides there is five times the quantity of free carbonic acid gas in the water of the sea that is required to keep the carbonate of lime in it in solution. Immense quantities of lime are nevertheless being abstracted from the sea to form the hard portions of the numerous animals which inhabit it. Crustacea, mollusca, zoophytes, and foraminifera are ever busy separating the little particles of carbonate of lime from the water, and solidifying them, and so supplying the materials for forming solid rock. It has been found that a large portion of the bed of the Atlantic between Europe and North America is covered with a light-colored ooze, composed chiefly of the perfect or broken skeletons of foraminifera, forming a substance, when dried, which, in appearance and structure, closely resembles chalk. In tropical regions, corals are building reefs of enormous magnitude, corresponding in structure to many rocks in the carboniferous and other formations. The rocks thus organically formed do not always occur as they were originally deposited; denudation has sometimes broken them up to redeposit them as a calcareous sediment. Great changes, too, may have taken place through metamorphic action in the texture of the rock, some limestones being hard, others soft, some compact, concretionary, or crystalline.

The chief varieties of limestone are: *chalk* (q.v.); *oolite* (q.v.); *compact limestone*, a hard, smooth, fine-grained rock, generally of a bluish-gray color; *crystalline limestone*, a rock which, from metamorphic action, has become granular; fine-grained white varieties, resembling loaf-sugar in texture, are called *saccharine* or *statuary marble*. *Magnesian limestone* or *dolomite* (q.v.) is a rock in which carbonate of magnesia is mixed with carbonate of lime. Particular names are given to some limestones from the kind of fossils that abound in them, as nummulite, hippurite, indusial, and crinoidal limestones; and to others from the formation to which they belong, as Devonian, carboniferous, and mountain limestones.

LIMESTONE, a co. in n. Alabama, having the state line of Tennessee for its n. boundary, the Tennessee river for its s., and for its s.w. the Elk river, flowing across the n.w. portion to enter the Tennessee; is drained by various other affluents; 650 sq.m.; pop. '80, 21,600—21,523 of American birth, 9,962 colored. It is intersected centrally from n. to s. by the Nashville and Decatur railroad, and crossed in the s.e. section by the Memphis and Charleston railroad, joining at the Tennessee river. It contains vast quantities of limestone rock, from which the county is named. Its surface is hilly, particularly in the n., and equally divided into prairie and woodland. Cash value of farms in '70, $1,816,510, numbering 1362. Its products are live stock, every variety of grain, tobacco, cotton, wool, sweet potatoes, honey, sorghum, and the products of the dairy. Seat of justice, Athens.

LIMESTONE, a co. in e. Texas, intersected from n. to s. by the Houston and Texas Central railroad; 950 sq.m.; pop. '80, 16,246—15,959 of American birth, 3,171 colored. It is drained by the head waters of the Navasoto river. Its surface is undulating, spreading in sections into broad prairies, with little timber. It has immense quantities of limestone rock, hence its name. Its soil is strong and fertile, producing oats, corn, cotton, wheat, sugar cane, wool, sweet potatoes, and live stock. Cash value of farms in '70, $1,121,390, numbering 483. Seat of justice, Groesbeck.

LIMFIORD. See DENMARK.

LIMITATION, in English law, is the limited time allowed to parties to commence their suits or actions, or other proceedings, so as to shorten litigation. In all civilized countries, some period is prescribed by statute (called statutes of limitations, or prescription) with this view, though few countries adopt the same limit, and Scotland differs much from England and Ireland in this point. In England, suits to recover land must generally be brought within 20 years, and to recover debts (including bills of

exchange) and damages within six years. Actions for assault or battery must be brought within four years, and for slander within two years. In Scotland, prescription is the word generally used for limitation, and actions to recover land generally must be brought within 40 years for many ordinary debts within three years, but for bills of exchange within six years. There are many other differences of detail. See Paterson's *Compendium of English and Scotch Law.*

LIMITATION, in law (*ante*). The "statute of limitations" was passed in the 23d year of James I. (1623), and its provisions have been substantially incorporated into the statutes of the American states. Actions in regard to real property must be brought within 20 years after the right of entry or of action accrues. If the person having such right be under any disability at the time such right accrues, the statute will not run till such disability be removed. An uninterrupted adverse possession for 20 years under a claim of right will bar the real owner of his rights in the property. Such possession must be known to the real owner, either actually or constructively, and must be without his consent; and the claim must be well known, and of a definitely bounded and ascertainable estate. Properly speaking, a mortgager's possession is not adverse to that of the mortgagee, as the relation between them is more in the nature of a tenancy; and such possession is, in the absence of evidence to the contrary, supposed to be permissive. But where either mortgager or mortgagee has been in possession for the statutory time, without any interest being paid or account rendered, and without any acknowledgment of or reference to the rights of the other, the right of the mortgager to redeem or of the mortgagee to foreclose will generally, in the absence of fraud, be barred. The limitation to most personal actions is six years, so that an adverse possession of personal property for six years creates a good title. In the case of slander for words actionable without proof of special damage, the statutory limitation is two years. The statute in all cases begins to run from the time the action accrues; which is, in contracts, upon breach of the same; in trover, the time of the tortious conversion, etc. On a promissory note, the statute begins to run at the expiration of the days of grace if grace be allowed, or on sight, notice, demand, or so many days after, according to the terms of the note. But on a note payable so many days from demand, etc., the demand, etc., must be made within six years. An action begins upon the reception of the writ by the sheriff or deputy, and if the service of the writ be deficient through such officer's fault, or any inevitable accident, an additional time of a year or thereabouts is generally allowed by statute to the plaintiff to bring his action again. In libel and assault and, as has been seen, in slander, the period of limitation is fixed at two years. In many of the United States this latter limit is fixed also for actions against executors and administrators, though in general equity exempts trust, from the operation of the statute. A new promise to pay a debt takes it out of the statute, but such a promise will not prevent the application of the statute to the interest on the principal of such debt.

LIMITED LIABILITY. See JOINT-STOCK COMPANIES, *ante;* and LIABILITY.

LIMITS, THEORY OF. The importance of the notion of a *limit* in mathematics cannot be over-estimated, as many branches of the science, including the differential calculus and its adjuncts, consist of nothing else than tracing the consequences which flow from this notion. The following are simple illustrations of the idea: The sum of the series $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} +$ etc., approaches nearer and nearer to 2 as the number of terms is increased; thus, the several sums are $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{7}{8}$, $1\frac{15}{16}$, etc., each sum always differing from 2 by a fraction equal to the last of the terms which have been added; and since each denominator is double of the preceding one, the further the series is extended, the less the difference between its sum and 2 becomes; also this difference may be made smaller than any assignable quantity—say, $\frac{1}{100000}$,—by merely extending the series till the last denominator becomes greater than 100,000 (for this, we need only take 18 terms; 3 terms more will give a difference less than $\frac{1}{1000000}$; and so on); again, the sum of the series can never be greater than 2, for the difference, though steadily diminishing, still subsists; under these circumstances, 2 is said to be the limit of the sum of the series. We see, then, that the criteria of a limit are, that the series, when extended, shall approach nearer and nearer to it in value, and so that the difference can be made as small as we please. Again, the area of a circle is greater than that of an inscribed hexagon, and less than that of a circumscribed hexagon; but if these polygons be converted into figures of 12 sides, the area of the interior one will be increased, and that of the exterior diminished, the area of the circle always continuing intermediate in position and value; and as the number of sides is increased, each polygon approaches nearer and nearer to the circle in size; and as, when the sides are equal, this difference can be made as small as we please, the circle is said to be the limit of an equilateral polygon the number of whose sides is increased indefinitely; or, in another form of words commonly used "the polygon approaches the circle as its limit, when its sides increase without limit," or again, "when the number of sides is infinite, the polygon becomes a circle." When we use the terms "infinite" and "zero" in mathematics, nothing more is meant than that the quantity to which the term is applied is *increasing without limit* or *diminishing indefinitely;* and if this were kept in mind there would be much less confusion in the ideas connected with these terms. From the same cause has arisen the discussion concerning the possibility of what are called vanishing fractions (i.e., fractions

whose numerator and denominator become zero simultaneously) having *real* values; thus $\frac{x^2-1}{x-1}=\frac{0}{0}$, when $x=1$; but by division we find that the fraction is equal to $x+1$, which $=2$, when $x=1$. Now, this discussion could never have arisen had the question been interpreted rightly, as follows: $\frac{x^2-1}{x-1}$ approaches to 2 as its limit, when x continually approaches 1 as its limit, a proposition which can be proved true by substituting successively 3, 2, $1\frac{1}{2}$, $1\frac{1}{3}$, $1\frac{1}{10}$, $1\frac{1}{100}$, etc., when the corresponding values of the fraction are 4, 3, $2\frac{1}{2}$, $2\frac{1}{3}$, $2\frac{1}{10}$, $2\frac{1}{100}$, etc. The doctrine of limits is employed in the differential calculus (q. v.). The best and most complete illustrations of it are found in Newton's *Principia*, and in the chapters on maxima and minima, curves, summation of series, and integration generally, in the ordinary works on the calculus.

LIM'MA, an interval which, on account of its exceeding smallness, does not appear in the practice of modern music, but which, in the mathematical calculation of the proportions of different intervals, is of the greatest importance. The limma makes its appearance in three different magnitudes—viz., the great limma, which is the difference between the large whole tone and the small semitone, being in the proportion of 27 to 25; the small limma, which is the difference between the great whole tone and the great semitone, being in the proportion of 135 to 128; and the Pythagorean limma, which is the difference between the great third of the ancients (which consisted of two whole tones) and the perfect fourth, the proportion of which is as 256 to 243.

LIMNÆ'A (Gr. *limne*, a swamp), a genus of gasteropodous mollusks of the order *pulmonata*, giving its name to a family, *limnæadæ*, allied to *helicidæ* (snails), *limacidæ* (slugs), etc. The species of this family are numerous, and abound in fresh waters in all parts of the world. They feed on vegetable substances. They all have a thin, delicate, horn-colored shell, capable of containing the whole animal when retracted, but varying very much in form in the different genera; being produced into a somewhat elongated spire in the true *limnææ* (POND-SNAILS), whilst in *planorbis* the spire is coiled in the same plane, and in *ancylus* (RIVER LIMPETS) it is limpet-shaped, with a somewhat produced and recurved tip. Many of the *limnæadæ* have a habit of floating and gliding shell downwards at the surface of the water, as may readily be observed in a fresh-water aquarium, in which they are of great use in preventing the excessive growth of confervoids, and removing all decaying vegetable matter. They serve the same purpose in the economy of nature in lakes, ponds, and rivers, and furnish food for fishes. They are hermaphrodite. They deposit their eggs on stones or aquatic plants, enveloped in masses of a glairy substance. The development of the young mollusk may easily be watched in the aquarium, the membrane of the egg being perfectly transparent.

LIMNO'RIA, a genus of crustacea of the order *isopoda*, containing only one known species, which, however, is important from the mischief it does to piers, dock-gates, and other wood-work immersed in the water of the sea, on the coasts of Britain, and of some parts of continental Europe. It is only about a sixth of an inch in length, of an ash-gray color, with black eyes, which are composed of numerous *ocelli*, placed close together. The head is broad. The legs are short. The general appearance resembles that of a small wood-louse, and the creature rolls itself up in the same manner, if seized. The contents of the stomach consist of comminuted wood, and food is the object of the perforation of wood for which the limnoria is notable. Mr. Stevenson found it very troublesome during the operations connected with the building of the Bell rock light-house. The piers at Southampton have suffered greatly from it. The kyanizing of wood and other expedients have been resorted to, to prevent its ravages.

LIMOGES, capital of the department of Haute-Vienne, in France, and of the former province of Limousin, picturesquely situated on a hill in the valley of the Vienne, 67 m. s.e. of Poictiers. It is an ancient city, and the seat of a bishop. It has a cathedral, begun in the 13th c., but still incomplete; a number of scientific and benevolent institutions and public buildings; considerable manufactures of porcelain (employing 2,000 hands), of druggets, of a kind of pack-thread known as Limoges, etc. It was the Augustoritum of the Romans, and afterwards received the name of Lemovica, whence the present Limoges. Before the French revolution it had more than 40 convents. Pop. '76, 55,097.

LIM'ONITE. See HEMATITE, *ante*.

LIMOUSIN, a small province of old France, now comprised in the departments of the Haute-Vienne and Correze, Limoges being the principal town of the former and Tulle of the latter. It is a hilly, elevated plateau, about 1700 ft. above the sea, traversed by spurs or ridges branching from the mountains of Auvergne, and furrowed by numerous small streams having their sources in the hills, and flowing to the bay of Biscay. The surface is mainly granitic, often sterile. The climate is moist and changeable. The poverty of the soil has always enforced continual migrations of its inhabitants, whose peculiar language, allied to the Spanish, always marks their nativity.

LIMOUX (ancient *Limosum*), a t. of France, in the department of Aude, in the center of a fertile valley, on the left bank of the Aude, 52 m. s.e. from Toulouse. There are

manufactures of fine broadcloths, yarn factories, tanneries, dye-works, etc. The neighborhood produces a much-esteemed white sparkling wine, known as *blanquette de Limoux*, which rivals champagne in excellence. Diligences ply regularly to Toulouse, Carcassonne, and Foix. Pop. '76, 6,037.

LIMPET, *Patella*, a genus of gasteropodous mollusks, of the order *cyclobranchiata*, the type of the family *patellidæ*. In all this family the shell is nearly conical, not spiral, and has a wide mouth, and the apex turned forwards. The animal has a large round or oval muscular foot, by which it adheres firmly to rocks, the power of creating a vacuum being aided by a viscous secretion. Limpets live on rocky coasts, between tide-marks, and remain firmly fixed to one spot when the tide is out, as their gills cannot bear exposure to the air, but move about when the water covers them; many of them, however, it would seem, remaining long on the same spot, which in soft calcareous rocks is found hollowed to their exact form. They feed on algæ, which they eat by means of a long ribbon-like tongue, covered with numerous rows of hard teeth; the COMMON LIMPET (*P. vulgaris*) of the British coasts having no fewer than 160 rows of teeth on its tongue, 12 in each row—1920 teeth in all. The tongue, when not in use, lies folded deep in the interior of the animal. The gills are arranged under the margin of the mantle, between it and the foot, forming a circle of leaflets. The sexes are distinct.—The power of adherence of limpets to the rock is very great, so that, unless surprised by sudden seizure, they are not easily removed without violence sufficient to break the shell. The species are numerous, and exhibit many varieties of form and color. The common limpet is most abundant on the rocky coasts of Britain, and is much used for bait by fishermen; it is also used for food. Some of the limpets of warmer climates have very beautiful shells. A species found on the western coast of South America has a shell a foot wide, which is often used as a basin.

LIMPOPO. See OORI.

LINA'CEÆ. See FLAX.

LIN'ACRE, THOMAS, 1460–1524; b. Canterbury; studied at Oxford; became fellow of All Souls' college in 1484; went to Florence and studied Greek and Latin with the ablest teachers; removed to Rome and applied himself to natural philosophy and medicine, studying chiefly the works of Aristotle and Galen, and translating some of Galen's treatises. Returning to England he received the degree of D.D. and the appointment of professor of physic from Oxford university; was called to the court by Henry VII. and made physician and tutor to prince Arthur; was subsequently physician to Henry VII., Henry VIII., and princess Mary. He founded two lectures on physic in the reign of Henry VIII. at Oxford, and one at Cambridge. In 1518, through his influence, the college of physicians in London was founded, and he was its first president, holding the office till his death. With Colet, Lily, Grocyn, and Latymer he restored classical learning in England. Late in life he studied divinity, and was in 1509 rector of Mersham and prebend of Wells; in 1518 was prebend and in 1519 precentor in the church of York. His most celebrated works are his Latin translations from Galen, among which are *De Temperamentis; De tuenda Sanitate; De Methodo Medendi.* His other works are a translation of *Proclus de Sphæra; De Emendata Structura Latini Sermonis Libri Sex.* He was buried in St. Paul's cathedral, where Dr. Caius erected a monument to his memory. In his literary character he held a very high rank, and as a physician his skill was unsurpassed.

LINA'RÉS, a t. of Spain, in the province of Jaen, 24 m. n.n.e. from Jaen. The neighborhood was celebrated in ancient times for its mines of copper and lead, which are still very productive. A fine fountain which adorns the town is supposed to be Roman. Pop. 15,000 to 18,000.

LINCOLN, a co. in s.e. Arkansas, having the Arkansas river, near its confluence with the Mississippi, for its n.e. boundary, is traversed diagonally by the bayou Bartholomew; 600 sq.m.; pop. '80, 9,255—9,198 of American birth, 5,044 colored. Its surface is level; the rich, nutritious grass of its prairies, being shaded for long distances near the water-courses by groves of ash and cypress, affords good pasturage; and the soil produces cotton and corn. It is intersected by the Little Rock, Mississippi River and Texas railway in the n.e. section. Seat of justice, Star City.

LINCOLN, a co. in s.e. Dakotah, having the Big Sioux river for its e. boundary, separating it from Iowa, and for its s.w. border the Vermilion river; about 550 sq.m.; pop. '80, 5,897—4,118 of American birth. It is thinly timbered; its plains producing buckwheat, barley, the products of the dairy, oats, corn, and wheat. Some attention is paid to the raising of live stock. Seat of justice, Canton.

LINCOLN, a co. in n.e. Georgia, having the Savannah river for its north-eastern border, separating it from the state of South Carolina, and Broad river, a tributary of the Savannah, for its northern boundary; is also drained by Little river, its southern and south-eastern boundary line; 300 sq.m.; pop. '80, 6,412—6,405 of American birth, 4,157 colored. Its surface is hilly, comprising large tracts of woodland; the quality of the soil varying in different sections, producing in the most favorable localities wine, sweet potatoes, wool, oats, wheat, cotton, and Indian corn, and offering fine pasturage for

stock. It produced in '70, 1865 lbs. of honey. It contains vast quantities of granite; gold is found, iron ore, and a kind of slate used for hones. It had in '78, 1 gold quartz mine, employing 11 men, with a capital of $30,000 and annual product of $7,000. Seat of justice, Lincolnton.

LINCOLN, a co. in n. Kansas, watered by the Saline river, an affluent of the Kansas river, is also drained by Wolf creek and affluents of the Soloman river; 720 sq.m.; pop. '80, 8,582. Its surface spreads out into limitless fertile plains, in many portions covered with timber, in others sinking into salt marshes or rising into low hills. Magnesia is a component part of the limestone that forms the foundation of the soil, which produces corn, wheat, wool, dairy products, and affording fine pasturage is well adapted to the raising of stock. Seat of justice, Lincoln.

LINCOLN, a co. in s. Kentucky, watered by Dicks river, an affluent of the Kentucky, and the head-waters of Green river, is intersected by the Knoxville line of the Louisville and Nashville railroad, forming a junction at its county seat, in the n.e. section, with the Richmond and Stanford branch; also the Cincinnati Southern in the w. and s.; 400 sq.m.; pop. '80, 15,079—14,992 of American birth, 3,908 colored. Its surface is hilly and thinly timbered; its soil, of a calcareous formation, producing the blue grass of the prairie, flax, maple sugar, sorghum, sweet potatoes, tobacco, wool, corn, rye, wheat, and the products of the dairy. It produced in '70, 10,730 lbs. of honey. Cattle, sheep, and swine are raised. Cash value of farms in '70, $4,002,549, numbering 597, including one of 1000 acres. It had in '70, 64 manufacturing establishments, with a capital of $90,350, and an annual product of $258,677. Among its industries are the manufacture of woolen goods, saddlery, and harness. It has distilleries, saw mills, and steam grist mills. Seat of justice, Stanford.

LINCOLN, a parish in n.w. Louisiana, formed 1873; is drained by the head-waters of the Dugdemona river, the Saline bayou, the bayou d'Arbonne, and numerous affluents of the Washita river; about 550 sq.m.; pop. '80, 11,075—11,048 of American birth, 4,900 colored. It is composed of portions of the counties of Bienville, Jackson, Union, and Claiborne. Its surface is uneven, and its soil has all the elements of fertility. Seat of justice, Vienna.

LINCOLN, a co. in s. Maine, having numerous inlets of the Atlantic ocean, which lies on its s. boundary, has the Kennebec river, navigable 44 m. from its mouth, for its s.w. border; 500 sq.m.; pop. '80, 24,809—24,330 of American birth, 46 colored. It is drained by the Sheepscot river, flowing through it from n. to s., emptying into the ocean not far from Bath. It has also Damariscotta lake, smaller lakes in the extreme n., Damariscotta river, the outlet of the lake, navigable by the largest ships, and the bays of its southern border. Its surface rises into long, high hills that sink into deep valleys. It is thinly timbered, and the soil under cultivation is very fertile, producing every variety of grain, wool, dairy products, honey, and maple sugar. Cattle, sheep, and swine are raised. Its commercial facilities are unsurpassed, its harbors being spacious, safe, and accessible. Much attention is paid to fishing, steamboats being used, with which large quantities of fish are taken with the seine, and pressed into oil in establishments for that purpose. It has also curing and packing establishments. Among its industries are ship-building and repairing, the manufacture of machinery, bricks, matches, lumber, sails, and wool; it has also wool-carding and cloth-dressing mills, and steam saw and flour mills. Cash value of farms in '70, $4,488,419, numbering 3,197. It had in '70, 309 manufacturing establishments, employing 1332 hands, with a capital of $587,280, and an annual product of $1,018,705. It is traversed near the coast by the Knox and Lincoln railroad from Rockland to Bath. It has an active coast trade, and ice is largely exported to southern ports. Seat of justice, Wiscassett.

LINCOLN, a co. in s.w. Minnesota, having the state line of Dakotah for its western boundary, is intersected in the extreme n.e. by the Winona and St. Peter railroad; about 540 sq.m.; pop. '80, 2,945—1876 of American birth, 2,942 colored. It is watered by the Yellow Medicine river, other tributaries of the Minnesota river, by lake Benton, 8 m. long, in its southern section, and a few smaller lakes. Its surface is level in the n., and rough and hilly in the extreme south. It has a fertile soil. Seat of justice, Marshfield.

LINCOLN, a co. in s.w. Mississippi, drained by the head-waters of the Bogue Chitto, a confluent of Pearl river, is intersected centrally by the Chicago, St. Louis and New Orleans railroad; 600 sq.m.; pop. '80, 13,547—13,407 of American birth. Its surface is level and is diversified by fertile plains and immense forests of magnolia, beech, and useful timber. Its soil is adapted to the production of live stock, rice, oats, corn, tobacco, cotton, wool, sweet potatoes, wine, honey, sugar cane, and the products of the dairy. It had in '70, 44 manufacturing establishments, employing 175 hands, with a capital of $92,332, and an annual product of $152,737. Seat of justice, Brookhaven.

LINCOLN, a co. in e. Missouri, having the Mississippi for its eastern boundary, separating it from Illinois, is drained by the Cuivre river; 600 sq.m.; pop '80, 17,443—16,606 of American birth, 2,144 colored. It is watered by Eagle fork and Big creek. Its surface is hilly and liberally supplied with building timber. Its soil, having an understratum of limestone, is very fertile in the valleys, being adapted to the raising of live stock, tobacco, every variety of grain, wool, sweet potatoes, dairy products, sorghum,

maple sugar, and flaxseed. It produced in '70, 17,172 lbs. of honey. Cash value of farms in '70, $5,133,736, numbering 2,129, including 4 of 1000 acres and over. Value of live stock in '70, $1,387,573. It had in '70, 94 manufacturing establishments, with a capital of $111,120, and an annual product of $270,285. Among its manufactories are flour and saw mills, tanneries, leather currying establishments, plow factories, tobacco factories, wool-carding and cloth-dressing mills. Seat of justice, Troy.

LINCOLN, a co. in s. Nebraska, having the North Platte river for its northern boundary, is traversed by the Republican river; about 2,592 sq.m.; pop. '80, 3,632—3,032 of American birth, 6 colored. Its surface is level and poorly timbered. The soil of the famous Platte valley is light and eminently productive, affording excellent facilities for stock raising. It is intersected by the Union Pacific railroad. Among its manufactories are breweries, cheese factories, and the railroad repair shops. Seat of justice, North Platte.

LINCOLN, a co. in s.e. New Mexico, organized 1869; having the state line of Texas for its e. boundary; traversed by the Pecos, the Rio Bonito, and numerous small streams; 13,000 sq.m.; pop. '70, 1803—1686 of American birth. Cash value of farms in '70, $139,770, numbering 368, none under 10 acres or over 500. Its surface is equally divided into mountain and prairie, with few trees, the eastern portion being a part of the great Staked Plain and the w. occupied by ranges of the White mountains and the Gaudalupe. Its soil when irrigated is fertile, and produces wheat, Indian corn, barley, and oats. It is largely taken up by Indian reservations, but has much tillable land. Seat of justice, Lincoln.

LINCOLN, a co. in w. North Carolina, having the Catawba river for its eastern border, is intersected centrally by one of its branches called the Little Catawba; 250 sq.m.; pop. '80, 11,061—11,051 of American birth, 2,881 colored. Its surface is uneven and equally divided into tillable lands, and hard-wood forests. It contains valuable deposits of iron ore. Gold is found in the eastern portion and on the banks of the Little Catawba. Its soil is fertile and adapted to the raising of buckwheat, oats, corn, rye, wheat, tobacco, cotton, wool, sweet potatoes, wine, honey, sorghum, flax, live stock, and the products of the dairy. It had in '70, two mining establishments of iron ore, employing 40 hands, with a capital of $43,000, and an annual product of $8,800. It had in '70, 65 manufacturing establishments, employing 294 hands, with a capital of $184,625, and an annual product of $319,025. Its industries are represented by manufactories of paper, cotton goods, pig iron, etc. Seat of justice, Lincolnton.

LINCOLN, a co. in s. Tennessee, having the state line of Alabama for its southern boundary, is traversed by the Elk river, and has the terminus of the Decherd to Fayetteville line of the Nashville, Chattanooga, and St. Louis railway, at its co. seat; 720 sq.m.; pop. '80, 26,960—26,900 of American birth, 6,316 colored. Its surface is uneven, well wooded with locust, poplar, and tulip trees, and hard-wood useful for building purposes. Its soil is fertile, producing maple sugar, sorghum, wool, sweet potatoes, tobacco, cotton, every variety of grain, and the products of the dairy. It produced in '70, 1,233,960 bushels of corn, and 44,838 lbs. of honey. Cash value of farms in '70, $6,521,190, numbering 3,393, including one of 1000 acres. It had in '70, 185 manufacturing establishments, employing 507 hands, with a capital of $223,236, and an annual product of $772,959, utilizing its valuable water-power. Among its industries are the manufacture of cotton yarn, woolen goods, saddlery and harness, and leather, and it has saw and flour mills. Seat of justice, Fayetteville.

LINCOLN, a co. in s.w. West Virginia, having the Coal river, an affluent of the Kanawha river for its eastern boundary, is drained in its western portion by the Guyandotte river, the Caney fork in the south-western, and other affluents of the Ohio and Kanawha rivers; 400 sq.m.; pop. '80, 8,739—8,723 of American birth, 52 colored. Its surface is mountainous, well provided with building timber and presents scenery of great beauty. It is watered by the Mud river, running at the base of the mountains, and parallel with them. The soil of the river bottoms is very rich, and is generally founded on carboniferous rock. Iron is abundant. Its products are buckwheat, oats, corn, rye, wheat, flax, maple sugar, tobacco, wool, honey, and sorghum. Cattle, sheep, and swine are raised. Seat of justice, Hamlin.

LINCOLN, a co. in s. Ontario, Canada, having lake Ontario for its n. boundary; intersected in the eastern section by the Welland canal; bounded on the e. by the Niagara river and the Erie and Niagara railroad, running parallel with the river for 28 m. from the town of Niagara to the International bridge, and is intersected by a branch of the Great Western railroad, running along the border of the lake, and crossing the canal to connect with the line to Niagara Falls; 321 sq.m.; pop. '71, 29,547. Its manufactories consist of foundries and machine shops, sewing-machine factories, soap and candle works, tanneries, woolen mills, breweries, flour and saw and planing mills. Ship building and repairing is among its industries, its ports having excellent shipyards. Seat of justice, St. Catherines.

LIN'COLN (called by the Romans *Lindum;* from which, with *Colonia* subjoined, comes the modern name), a city of England, capital of the county of the same name, a parliamentary and municipal borough and county of itself, is situated on the Witham,

140 m. n.n.w. of London by railway. Built on the slope of a hill, which is crowned by the cathedral, the city is imposing in effect, and can be seen from a very considerable distance. It is very ancient, is irregularly laid out, and contains many interesting specimens of early architecture. The cathedral, one of the finest in England, is the principal building. It is surmounted by three towers, two of which, 180 ft. in height, were formerly continued by spires of 101 feet. The central tower, 53 ft. square, is 300 ft. high. The interior length of the cathedral is 482, the width 80 feet. The famous bell called Tom of Lincoln was cast in 1610, and was hung in one of the w. towers of this edifice. It was broken up, however, in 1834, and, together with six other bells, was recast to form the present large bell and two quarter bells. The present bell, which hangs in the central tower, is 5 tons 8 cwt. in weight; and is 6 ft. 10½ in. in diameter at the mouth. The style of the cathedral, though various, is chiefly early English. Lincoln also contains many other interesting religious edifices, among which are three churches, dating from before the reformation, etc., numerous schools, and benevolent institutions. Several iron foundries and manufactories of portable steam-engines and agricultural machines, as well as large steam flour-mills, are in operation here, and there is an active trade in flour. Brewing and machine-making, with a trade in corn and wool, are also carried on. Two members are returned to the house of commons for the city. Pop. '61, 20,999; '71, 26,766.

Lincoln, under the Romans, was a place of some importance, and under the Saxons and the Danes it preserved a good position. It was the seat of an extensive and important trade at the time of the Norman conquest; but its advancement since that time has not been equally rapid. It contains some very interesting antiquities, as the Roman gate, the remains of the palace and stables of John of Gaunt, and the town-hall.

LINCOLN, the capital t. of Logan co., Ill., near Salt creek, on the Chicago and Alton railroad, where it crosses the Indianapolis, Bloomington and Western railroad; also, on the Pekin branch of the Wabash railroad; 28 m. n.n.e. of Springfield, and 157 m. s.s.w. of Chicago. Pop. 5,000. It is the seat of Lincoln university (Cumberland Presbyterian), and of the state institution for feeble-minded children. The place contains 11 churches, 2 or 3 banks, a high school, a court-house, and manufactories of farm implements; also 1 daily and 4 weekly newspapers. Coal is mined in the neighborhood.

LINCOLN, a city, the capital of Nebraska and of the co. of Lancaster, situated at the junction of several branches of Salt creek; lat. about 40° 50′ n., long. 96° 45′ west. It is 66 m. s.w. of Omaha, and 168 m. n.w. of Leavenworth, Kansas, and lies upon the Nebraska or Midland Pacific, where it crosses the Burlington and Missouri river railroad, and is besides the n.w. terminus of the Atchison and Nebraska railroad. It was made the capital of the state in 1867; pop. about 10,000. It is surrounded by beautiful undulating prairies, and fine building sites abound in its neighborhood. It is regularly laid out; the 17 avenues running n. and s. bear numerical names, while the cross-streets bear the names of the letters of the alphabet. The avenues are 120 ft. and the streets 100 ft. wide. Among the public buildings are the state-house (built of light-colored limestone), the state asylum for the insane (built of sandstone, and costing $136,000), the penitentiary (built of limestone at a cost of $312,000), the state library, an opera-house, a high-school, the Nebraska state university and agricultural college (open in all departments to students of both sexes), and 10 churches. The city has two national and several other banks; two daily, one semi-weekly, and three weekly newspapers. In the near vicinity are abundant saline springs, from which large supplies of salt are obtained.

LINCOLN, ABRAHAM, sixteenth president of the United States was b. in Kentucky, Feb. 12, 1809. His grandfather was an emigrant from Virginia; his father, a poor farmer, who, in 1806, removed from Kentucky to Indiana. In the rude life of the backwoods, Lincoln's entire schooling did not exceed one year, and he was employed in the severest agricultural labor. He lived with his family at Spencer co., Indiana, till 1830, when he removed to Illinois, where, with another man, he performed the feat of splitting 3,000 rails in a day, which gave him the popular *sobriquet* of "the rail-splitter." In 1834 he was elected to the Illinois legislature. At this period he lived by surveying land, wore patched homespun clothes, and spent his leisure hours in studying law. He was three times re-elected to the legislature; was admitted to practice law in 1836; and removed to Springfield, the state capital. In 1844 he canvassed the state for Mr. Clay, then nominated for president. Mr. Clay was defeated, but the popularity gained by Lincoln in the canvass secured his own election to congress in 1846, where he voted against the extension of slavery; and in 1854 was a recognized leader in the newly formed republican party. In 1855 he canvassed the state as a candidate for United States senator against Mr. Douglas, but without success. In 1856 he was an active supporter of Mr. Fremont in the presidential canvass which resulted in the election of Mr. Buchanan. In 1860 he was nominated for the presidency by the Chicago convention over Mr. Seward, who expected the nomination. The non-extension of slavery to the territories, or new states to be formed from them, was the most important principle of his party. There were three other candidates—Mr. Douglas of Illinois, northern Democrat; Mr. Breckenridge of Kentucky, then vice-president, and afterwards a general of the confederate army, southern democrat; and Mr. Bell of Tennessee, native American. With this division, Mr.

Lincoln received a majority of votes over any of the other candidates, though a million short of an absolute majority; every southern and one northern state voted against him. He was installed in the president's chair, Mar. 4, 1861. His election by a sectional vote and on a sectional issue hostile to the south, was followed by the secession of 11 southern states, and a war for the restoration of the union. As a military measure, he proclaimed, Jan. 1, 1863, the freedom of all slaves in the rebel states; and was re-elected to the presidency in 1864. The war was brought to a close, April 2, 1865; and on the 15th of the same month, Lincoln was cut off by the hand of an assassin. See the Lives by Lamon (vol. i. 1870) and Leland (1879).

LINCOLN, ABRAHAM (*ante*), the 14th elected president of the United States, serving the 19th term of 4 years; b. in Hardin co., Ky., Feb. 12, 1809; his father being Thomas Lincoln, who married Nancy Hawks. The family was of English descent, and early among the settlers of Virginia. Whether the family was connected with the Lincolns of Massachusetts is not known. The birthplace of the war-president was no paradise. Kentucky was the rendezvous of tories, runaway conscripts, deserters, debtors, and criminals of all kinds. Thomas Lincoln was a restless, thriftless man, living by jobs of carpentry and other work, until finally, deciding to try farming, he settled down in a wretched cabin near a spring of good water, but in a barren region. In that humble cabin Abraham was born. The boy was fond of fishing and hunting, but at an early age he began to grow serious, and of himself to develop the moral training which became so conspicuous in after-life. With his sister he traveled to a humble school four miles away. In 1816 Thomas Lincoln had a serious difficulty with a neighbor, the result of which was his emigration to Ohio in the autumn of that year, transporting his household goods on a rude flat-boat, and losing almost everything by the capsizing of the craft. Saving a few tools and the greater portion of his whisky, he brought up in Posey co., Ind., sold his boat, and chose a location in the wilderness in Perry county. With much difficulty he brought his family there, consisting of his wife Nancy, a daughter 9 years old, and Abraham, aged seven. Here in Oct., 1818, Abraham's mother died. The widower 13 months afterwards married a widow with whom he had been in love before he married Nancy Hawks. The new wife was a good step-mother to little Abraham and his sister (whose name was changed from Nancy to Sarah), although she brought a son and two daughters of her own. She found her step-children dirty and poorly clad, for they had been sadly neglected; but, being a woman of energy, a speedy and thorough reformation followed her advent. She took kindly to Abraham, and her love continued to the day of his death. She encouraged him in his studies, and all was harmonious and happy in the mixed family. It was not to his real mother but to his step-mother that Lincoln, in after years, so often referred as "saintly" and an "angel," who first made him feel like a human being, whose goodness first touched his childish heart, and taught him that blows and taunts and degradation were not always to be his portion in this life. He had but little chance for schooling, but that little was well improved. He grew in height amazingly, and before his 17th birthday was at his maximum of 6 ft. 4 in., wiry and strong, with enormous hands and feet, greatly disproportionate length of legs and arms, and over all a rather small head; his skin was yellow and shriveled, and his complexion swarthy. He wore coarse home-made clothes, and a coon-skin cap; his trousers, owing to his rapid growth, were nearly a foot too short. But this awkward, overgrown boy was always in good humor, and always in good health. While at school he was noted as a good speller, but more particularly for his abhorrence of cruelty—his earliest composition being a protest against putting coals of fire on the backs of captured terrapins. His last attendance at school was in 1826, when he was 17 years old. He worked at odd jobs, and one of his employers says "Abe was awful lazy; he would laugh and talk and crack jokes and tell stories all the time; he didn't love work." He would lie under a tree or in the loft of the house, and at night sit in the firelight to read, cipher, and scribble on the wooden fire-shovel. He read everything readable within his reach, and copied passages or sentences that especially attracted him. His reading, however, included little more than *Robinson Crusoe*, *Pilgrim's Progress*, *Weems's Life of Washington*, and a *History of the United States*. His step-mother said that the Bible was one of his favorite books. His first knowledge of the law, in which he afterwards became eminent, was through reading the statutes of Indiana, borrowed from a constable. He had a strong memory and a taste for speaking in public. In 1825 he worked 9 months on a ferry over the Ohio river, receiving a salary of $6 per month. His first venture in the great outside world was as assistant navigator of a flat-boat down the Ohio and the Mississippi to New Orleans, returning in June, 1828. In 1830 the Lincolns emigrated to Illinois, Abraham being the driver of a wagon hauled by 4 yoke of oxen. A few days after their arrival at their destination near Decatur, Lincoln became of age, and at once determined to make his own way in the world. The story of his making rails is fixed at this period, but it is apocryphal, and the "Illinois rail-splitter" was a misnomer. In this period Lincoln got a tolerable knowledge of grammar from a borrowed book, studied by the light of burning shavings in a cooper's shop. In 1832 came the Black Hawk Indian war, and Lincoln enlisted in a company at Sangamon and was chosen captain; but there were no remarkable acts done by him during the campaign.

In 1832, the year of Jackson's second election as president, Lincoln made his first appearance in politics as a candidate for the state assembly on the following platform: "I presume you all know who I am; I am humble Abraham Lincoln. I have been solicited by many friends to become a candidate for the legislature. My politics are short and sweet, like the old woman's dance. I am in favor of a national bank; I am in favor of internal improvements, and a high protective tariff. These are my sentiments and political principles. If elected I shall be thankful; if not, it will be all the same." This was straight whig doctrine. Lincoln made a good canvass, but he was not elected. His next venture was as a partner in a dry goods and grocery store at New Salem, but the concern failed, the partner fled, and Lincoln was left to settle up a losing business, paying all he owed in 1849. Having no faculty for trade, he now began to read in law, studied hard, and made rapid progress. Then he suddenly studied surveying, and tried his hand with compass and chain. In May, 1833, he was appointed postmaster at New Salem—compensation, next to nothing. He was not able to hire a room, and was said to have "carried the post-office in his hat." The mails came once a week, and their burden was light. In 1834 Lincoln's personal property was about to be sold by the sheriff to satisfy a judgment; but a new friend, James Short, bid in the property and gave it over to him. In 1834 he was again a candidate for the legislature, and was elected, running far ahead of his ticket. The party now had assumed the name of whig, and he soon became a whig leader. His first love episode was painfully sad. While boarding with James Rutledge, in New Salem, he became enamored of Ann, his landlord's daughter, a well-educated girl of 17, who had at the time another lover, who promised marriage, but did not keep his word. Lincoln and Ann Rutledge were betrothed in 1835, but the girl's health failed, and in August she died of brain fever. Her loss made Lincoln almost insane, and he raved piteously. "I can never bear to have snow, rain, and storm beat upon her grave," and "in her grave my heart lies buried," he cried out. It was at the time of her death that he took a liking to the poem by an English writer, the rev. Vicesimus Knox, commencing "Oh, why should the spirit of mortal be proud," lines that he was never weary of quoting; indeed, he repeated them so often that many people supposed him to be the author.

On taking his place in the legislature, Lincoln first saw Stephen A. Douglas, with no idea that he would be his competitor for the highest office in the nation. In 1836 Lincoln was again a candidate for the legislature on the following characteristic platform: "I go for all sharing the privilege of the government who assist in bearing its burdens. Consequently I go for admitting all whites to the rights of suffrage who pay taxes or bear arms, by no means excluding females." With the opposition candidate Lincoln stumped the district, as was then the custom, and by his vigorous speeches secured a whig victory, the first ever known in Sangamon county. Lincoln and Douglas were both chosen; but Douglas served only one session, and the next year was nominated for congress. In the presidential contest in 1836 Lincoln was for Hugh L. White of Tennessee, but the "hard cider" campaign of 1840 found him vociferous for Harrison and Tyler. With the struggle of Jackson against the U. S. bank and the shifting policy of Van Buren, Lincoln had no interest, attending diligently to his duties as a legislator, and beginning that antislavery record upon which so much of his fame will ever rest. The abolitionists were in the highest activity. George Thompson had just gone back to England after stirring up the small but enthusiastic party in this country; Garrison's *Liberator* was intensely annoying to the supporters of slavery; there was a great anti-abolitionist meeting in Boston; and president Jackson had, at the close of 1835, invited the attention of congress to the circulation through the mails of what were then called "inflammatory" documents. Henry Clay, Edward Everett, many of the governors of the northern states, and a large majority of the house of representatives strenuously opposed the agitation of the slavery question; all petitions on the subject were laid on the table without reading or debate, and all possible means were taken to prevent the discussion of the annoying subject. Illinois did not escape, though none of her citizens desired to establish or even uphold slavery. On the night of Nov. 7, 1837, the rev. Elijah P. Lovejoy was mobbed and shot dead at Alton for persisting in publishing an abolition newspaper. At this juncture, when the legislature was about to pass resolutions deprecating the antislavery agitation, Lincoln presented his protest, to which he could get but one signer besides himself, in which he declares slavery to be founded on injustice and bad policy; but that abolition agitation tends to increase its evils; that congress cannot interfere with slavery in the states, but might in the District of Columbia on the request of the people. This protest was meant to avoid extreme views, and so no mention was made of slavery in the territories, that point being covered by the Missouri compromise, which was then in full force. Lincoln was never extreme, and probably till the war began he saw no hour when he would have altered a word in this protest. When the state capital was removed to Springfield in 1839, Lincoln established himself there. He had been licensed as an attorney two years before, and being at the capital he could attend both to his duties as a member of the legislature and his legal practice. His business grew rapidly, and he took into partnership John T. Stuart, a prominent whig, who had been a kind friend in former years, Lincoln preferring to be the junior in the firm. Springfield was a poor village of about 1500 inhabitants; and Lincoln was poor, indeed much in debt. It is said that his friend Bill Butler fed and

clothed him for several years. In Jan., 1837, he delivered an oration on "The Perpetuation of our Free Institutions," whose eloquence greatly added to his fame. In Dec., 1839, Lincoln, on behalf of the whigs, challenged the other side to a joint debate, and Douglas and three other democrats were pitted against Lincoln, Logan, and two other whigs. The intellectual struggle between Lincoln and Douglas is still known as "the great debate;" and Lincoln was acknowledged to have had the best of the arguments. In 1840 Lincoln was an elector on the Harrison ticket, and made speeches in all parts of the state. But one-sided speeches were not suited to his temper; he preferred joint debates, where he could employ his masterly skill at retort. For twenty years (1838 to 1858) he followed Douglas, who was nearly always ready to accommodate him with a discussion. They fought their battles over and over, until one became president of the United States and the disappointment of the other had been buried in the grave a few months after Lincoln's inauguration. About 1839 Lincoln made the acquaintance of Mary, the daughter of hon. Robert S. Todd, of Lexington, Ky. They were engaged to be married; the day was set, and the supper made ready, but Lincoln failed to appear; he had gone quite crazy, and remained so for a year. His friend Speed took him to Kentucky, where he was kept until he had recovered his reason. In honorable fulfillment of his promise he married Miss Todd, Nov. 4, 1842. Mrs. Lincoln was a politician and a satirical writer of rare power. She wrote for the local papers and very soon involved her husband in a duel with Mr. Shields, then state auditor. Shields challenged Lincoln and they met in Missouri, but affairs were explained and the fight did not come off. In 1844 Lincoln was again an elector on the Clay (whig) ticket, and labored hard, but in vain for that great statesman. A handful of votes cast in New York for Birney, the abolition candidate, being a subtraction from the whig strength, gave the vote of that state to Polk and defeated and politically killed Clay. In 1846 Lincoln was elected to congress by 1511 majority in a district which, two years before, gave him only 914. He took his seat at the opening of the 30th congress, Robert C. Winthrop being speaker. In that house he was the only whig member from Illinois, with such democrats to watch him as John Wentworth, William A. Richardson, John McClernand; and Stephen A. Douglas in the senate. "There were giants in those days" in congress, such on the whig side as John Quincy Adams, Horace Mann, Washington Hunt, Jacob C. Collamer, Joseph R. Ingersoll, John M. Botts, Caleb B. Smith, Alexander H. Stephens, Robert Toombs, Samuel H. Vinton, and Robert C. Schenck; of democrats, Wilmot of Penn., McLane of Md., McDowell of Va., Rhett of S. C., Cobb of Ga., Boyd of Ky., Thompson of Miss., and George W. Jones and Andrew Johnson of Tenn. In the senate were Webster, Calhoun, Benton, Berrien, Clayton, Bell, Hunter, and W. R. King. Lincoln was put on the committee on post-offices and post-roads. He was opposed to the Mexican war, but voted for supplies to carry it on. In 1848 he favored the nomination of Taylor (whig) for president, and made a strong political speech in the house for that purpose, subsequently speaking in various parts of the country. In the second session of the 30th congress he made no especial mark. His law partnership with Stuart ended, April, 1841, when he united in practice with ex-judge Stephen T. Logan, and soon afterwards formed a partnership with his best friend, William H. Herndon. Dec. 3, 1839, Lincoln was admitted to practice in the federal courts, on the same day with Stephen A. Douglas. Many curious anecdotes are told of the great story-teller, of his power, his energy, his oddities, and his generosity. He was for a time counsel for the Illinois Central railroad company, by whom he was badly treated. In 1859 he went to Cincinnati to argue the McCormick reaper case and found Edwin M. Stanton one of his colleagues; but Stanton treated him with such discourtesy that it seems remarkable that Lincoln ever made the haughty Edwin a member of his cabinet. Lincoln wanted to be commissioner of the general land-office, but did not get the appointment. He was offered the governorship of Oregon territory, but his wife declined to go there, and he would not accept. For two years after leaving congress he was not publicly prominent. In 1850 he refused a nomination for congress; July 1, 1852, he was selected at a meeting of citizens to deliver a eulogy on Henry Clay. The bill offered by Douglas, Jan. 4, 1854, to establish a territorial government in Nebraska reopened the antislavery war, and Lincoln was forced to take decided ground against the extension of slavery into the territories, which he did at the state fair at Springfield in Oct. in a speech of great power. Douglas was there, chafing like a tiger under the scathing remarks of his great opponent. He endeavored to reply, but was too much excited to speak coherently. He promised to conclude in the evening, but did not appear. Other contests between the two followed, but they finally agreed to give up joint discussion. In Nov., in spite of his positive declination, Lincoln was again elected to the legislature. At the same time he was very desirous to succeed Shields (democrat) in the U. S. senate; but Lyman Trumbull carried off the prize. During the Kansas excitement Lincoln's sympathies were all in favor of the free-state side, but he discountenanced the use of force. In 1856 he said to the force party: "I agree with you in Providence; but I believe in the providence of the most men, the largest purse, and the largest cannon. You are in a minority—a sad minority—and cannot hope to succeed, reasoning from all human experience. You would rebel against the government, and redden your hands in the blood of your countrymen. If you are in the minority, as you are, you cannot succeed. Your attempt to resist the law of Kansas by force is criminal and wicked, and

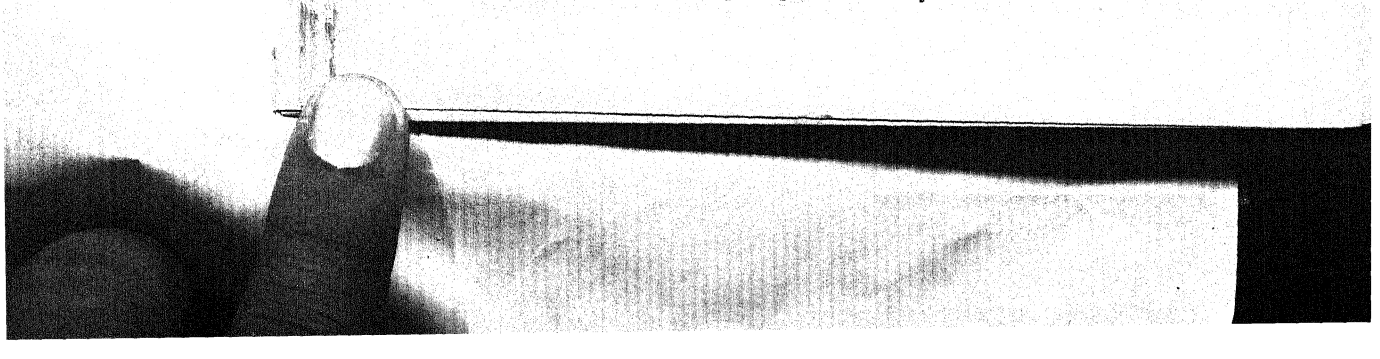
all your feeble attempts will be follies, and end in bringing sorrow on your heads, and ruin the cause you would freely die to preserve."

It was at the state convention at Bloomington in 1856 that the republican party in Illinois was formed, and there Lincoln made what is considered by many the greatest of all his speeches. Up to this time he had argued the slavery question on the ground of policy, never reaching to the radical right of the matter. At Bloomington he was baptized to freedom; he was newly born, and had all the fervor of a fresh convert; his heart was alive to the right; he felt justice; the flame, smothered for years, broke out; his sympathies burst forth, and then and there he unburdened his penitential soul. A hearer said of the speech: "It was fresh, new, odd, original, filled with fervor and enthusiasm; it was full of fire, energy, and force, of great truths and the sense of right; it was justice and equity set ablaze by the force of the soul; it was hard, heavy, knotted, gnarled, and heated." From that hour to the night of his murder slavery had no more persistent opponent than the man whom slavery assassinated. On June 17, 1856, in the first Republican national convention at Philadelphia, Lincoln's name was put forth for vice-president, and was received with considerable favor; but Wm. L. Dayton was selected, having 259 votes to 110 for Lincoln and 180 scattering. This year, for the third time, Lincoln was on the electoral ticket, now as a republican, and spoke and worked for Fremont's success. All this time the Kansas question was prominent, and in the close of the long struggle it became to Lincoln the passport to the presidency through the pertinacity of Douglas in sticking to his idea of "squatter (or popular) sovereignty." This split the democratic party in 1860, and made Lincoln's success certain. In 1858 he made a speech at the republican state convention for the purpose of securing a nomination for U. S. senator. His friends were surprised, and nearly all agreed that the speech was injudicious and would ruin his prospects. In this speech he foreshadowed Seward's "irrepressible conflict." One of Lincoln's nearest friends says: "I think the speech was intended to take the wind out of Seward's sails" (for the nomination for president). The state was thoroughly canvassed by Douglas and Lincoln; the democrats carried both branches of the legislature; Douglas was re-elected U. S. senator, and Lincoln was bitterly disappointed. When asked how he felt, he said "like the boy who stubbed his toe; it hurt too bad to laugh, and he was too big to cry."

In the winter of 1858–59 Lincoln appeared as a lecturer, starting with Adam and Eve for subject, and coming down to the "invention of negroes and the present mode of using them." Parts of the lecture were witty or humorous, but on the whole it was commonplace; his friends were mortified, and he soon gave up the lecturing business. In April, 1859, the people of his own town began to talk of Lincoln as a proper candidate for president, but he discouraged the idea. In Sept. he made speeches in Ohio in the track of Douglas; in Dec. he spoke at several places in Kansas. He was more and more talked of for a presidential nomination, and finally authorized his friends to work for him. Feb. 25, 1860, on invitation, he appeared in New York to deliver a speech. He spent that day (Saturday) in revising the speech; on Sunday went to hear Mr. Beecher preach; on Monday wandered over the city, and finally delivered his speech in Cooper Institute. The address was warmly praised in most of the city journals, and was in fact highly successful, After this he spoke in many cities in New England. He was present, though not a delegate, at the Illinois state convention, May 9, 1860, where he received the most flattering evidences of his great popularity, which was fully assured by the adoption without dissent of a resolution declaring him the choice of the republicans of Illinois for president, and instructing the delegates to the Chicago convention to use all honorable means to secure his nomination.

On May 16, 1860, the republican national convention met at Chicago. The city was full of political workers, and no previous convention had half the number of "outside delegates." Two days were spent in organization and the adoption of a platform, and balloting came on the third day. Up to the previous evening Seward's nomination seemed certain; but the outside pressure for Lincoln was powerful, for his friends were chiefly men of Illinois, and the convention was held in their state. On the first ballot the vote was: Seward, 173½; Lincoln, 102; Cameron, 50½; Chase, 49; Dayton, 14; McLean, 12; Collamer, 10; and six scattering. On the second ballot: Seward, 184½; Lincoln, 181; Chase, 42½; Bates 35; Dayton, 10; McLean, 8. On the third trial Lincoln got the nomination, and in the afternoon Hannibal Hamlin of Maine was nominated for vice-president. Lincoln was at Springfield, evidently very nervous. When he learned the result of the second ballot he felt sure of success. Then came news of the triumph, which he received without special emotion, and after shaking hands with a few friends said: "Gentlemen, there is a little short woman at our house who is probably more interested in this dispatch than I am; if you will excuse me I will take it up and let her see it." On the following day a committee of the convention made a formal tender of the nomination, which Lincoln accepted in a very brief speech:

"Imploring the assistance of divine providence, and with due regard to the views and feelings of all who were represented in the convention; to the rights of all the states and territories, and the people of the nation; to the inviolability of the constitution and the perpetual union, harmony, and prosperity of all, I am most happy to co-operate for the practical success of the principles declared by the convention."



The democratic national convention at Charleston split on the slavery question. The South totally repudiated Douglas and his squatter sovereignty, while Douglas was equally determined to stick to it. Most of the Southern delegates withdrew and organized a separate convention. Those who remained voted 57 times for a candidate, Douglas always having the highest number, but not the two-thirds required by democratic precedent. They adjourned to meet at Baltimore June 18. The seceders adjourned to meet at Richmond on the first Monday of June, but on that date further adjourned to meet June 28 in Baltimore. The result finally was the nomination of three presidential candidates; Douglas by his convention, Breckinridge of Kentucky by the seceders, or extreme southerners, and Bell (formerly a whig) of Tennessee by the "constitutional union" party, composed for the most part of "know-nothings" and old-time whigs. The canvass was warm on all sides; and Douglas, encouraged by the result of the spring elections, felt certain of victory. Election day was Nov. 6, when by far the largest vote ever cast in the union was given. Lincoln got 1,857,601; Douglas, 1,291,574; Breckenridge, 850,082; and Bell, 646,124; Lincoln lacked 930,170 of a majority, but the electoral vote told a different story, being 180 for Lincoln, 72 for Breckinridge, 30 for Bell, and only 12 for Douglas.

Lincoln felt deeply the responsibility of his great trust, and still more keenly the difficulty of administering the government for the sole benefit of an organization which had no existence in one-half of the union. He was anxious to take prominent southerners, such as Alexander H. Stephens, and Gilmore of North Carolina, into his cabinet; but they refused all such advances. Secession was determined upon, and events tending to that end followed rapidly. Nov. 10, only four days after the election, a bill was proposed in the South Carolina legislature to equip 10,000 volunteers, a U. S. senator from that state resigned, and a state convention was ordered to consider the question of secession. During that month and the next, senators and officers of the army resigned; secession meetings and conventions were held; the South accumulated arms and enlisted troops; and Dec. 20 the South Carolina convention unanimously adopted an ordinance seceding from the union. The year closed in gloom, and 1861 opened with no hope of peace. On Feb. 4 a peace congress met in Philadelphia; on the same day delegates met at Montgomery, Ala., to form a southern confederacy, and on the 18th the work was done, and Jefferson Davis was inaugurated president. In the mean time Lincoln was making his way towards Washington. After an affectionate parting with his mother who said she was sure she would never see him again, he put his house in order, handed over the law business to his partner, with a request that the old sign should remain for four years at least, and on Feb. 1 the arrangements for the journey were completed. He bade farewell to his life-long friends in a brief and touching address, and turned his face toward the mighty responsibilities soon to be thrown upon him. Everywhere the people were anxious to see and hear him, and he made brief addresses at Indianapolis, Columbus, Cleveland, Pittsburg, before the New York legislature, in New York (in response to the mayor), in Trenton, Philadelphia, and Harrisburg. While at Philadelphia there came rumors of a threatened attack upon his life; bridges were to be burned, tracks torn up, torpedoes exploded, and all manner of weapons were to be drawn against one of the most peaceful men in all the country. The great mass of this menace was sheer bravado, yet his friends (not himself) deemed it proper to take extra care. On the morning of Washington's birthday Lincoln raised the old flag over Independence hall in Philadelphia, and immediately proceeded to Harrisburg. Here he was taken in charge by a few picked friends and the leading railroad officers, and early the next evening quietly went from his hotel to a special train for Washington. He wore no disguise; but changed his stiff hat for a soft one, and threw on a shawl to conceal his features if necessary. At Philadelphia he was quietly transferred to the Baltimore railroad, reached Baltimore at 3½ A.M., passed unnoticed, and was safe in Washington at 6 o'clock. His family followed in another train. His secret and safe arrival caused much comment, and he himself quickly regretted that he had not traveled openly in sight of all the people; he felt that he had laid himself open to the charge of cowardice. Almost the first news he heard was the surrender of gen. Twiggs in Texas, a great gain to the secessionists. Lincoln was inaugurated on Monday, Mar. 4, and delivered an elaborate address, full of the best qualities of his nature. Ex-president Buchanan accompanied him to the White House and invoked peace and happiness for his administration. The appearance of the new president is thus described by Ward Lamon in his *Life of Abraham Lincoln:* "He was 6 ft. 4 in. high, the length of his legs being out of all proportion to that of his body. When he sat on a chair he seemed no taller than an average man, measuring from the chair to the crown of his head; but his knees rose high in front. He weighed about 180 lbs., but was thin through the breast, narrow across the shoulders, and had the general appearance of a consumptive subject. Standing up, he stooped slightly forward; sitting down, he usually crossed his long legs or threw them over the arms of the chair. His head was long, and tall from the base of the brain and the eyebrow; his forehead high and narrow, inclining backward as it rose. His ears were large and stood out; eyebrows heavy, jutting forward over small sunken blue eyes; nose long, large, and blunt; chin projecting far and sharp, curved upward to meet a thick lower lip, which hung downward; cheeks flabby, the loose skin falling in folds; a mole on one cheek, and an uncommonly prominent Adam's apple in his throat. His hair

was dark brown, stiff, and unkempt; complexion dark, skin yellow, shriveled, and leathery. Every feature of the man—the hollow eyes, with the dark rings beneath, the long, sallow, cadaverous face, intersected by those peculiar deep lines, his whole air, his walk, his long and silent reveries, broken at intervals by sudden and startling exclamations, as if to confound an observer who might suspect the nature of his thoughts—showed that he was a man of sorrows, sorrows not of to-day or yesterday, but long-treasured and deep, bearing with him continual sense of weariness and pain." Yet this strangely sorrowful man dearly loved jokes, puns, and comical stories, and was himself world-famous for his inimitable narrative powers. He drank very little, and was in precept and example a temperance man; and at table always ate sparingly. He was never a member of a church; he is believed to have had philosophical doubts of the divinity of Christ, and of the inspiration of the Scriptures as these are commonly stated in the systems of doctrine called evangelical. In early life he read Volney and Paine, and wrote an essay in which he agreed with their conclusions. Of modern thinkers he was thought to agree nearest with Theodore Parker.

Mr. Lincoln took the executive chair in a dark and stormy time. Vast preparations for war had been made in the south, and, except with him and a few still hopeful men, a contest was looked upon as inevitable. In his inaugural address he said that he should "take care that the laws of the union be faithfully executed in all the states;" adding, "I trust this will not be regarded as a menace. There need be no bloodshed or violence, and there shall be none unless it be forced upon the national authority. The power confided to me will be used to hold, occupy, and possess the property and places belonging to the government, and to collect the duties and imposts; but, beyond what may be necessary for these objects, there will be no invasion, no using of force against or among the people anywhere. Physically speaking, we cannot separate, we cannot remove our respective sections from each other, nor build an impassable wall between them. A husband and wife may be divorced, and go out of the presence and beyond the reach of each other; but the different parts of our country cannot do this. They cannot but remain face to face; and intercourse, either amicable or hostile, must continue between them. Is it possible, then, to make the intercourse more advantageous or more satisfactory after separation than before? The chief magistrate derives all his authority from the people; and they have conferred none upon him to fix terms for the separation of the states. His duty is to administer the present government as it came into his hands, and to transmit it unimpaired by him to his successor. In your hands, my dissatisfied fellow-countrymen, and not in mine, is the momentous issue of civil war. You can have no conflict without being yourselves the aggressors. You have no oath registered in heaven to destroy the government, while I shall have the most solemn one to preserve, protect, and defend it." In fact he denied the right of any state or number of states to go out of the union. The confederates considered this address to amount to a declaration of war, and hastened their preparations. In the north the address united and consolidated the people in support of its views. Less than six weeks afterwards, gen. Beauregard, on behalf of the confederate government, demanded the surrender of Fort Sumter in Charleston harbor, then garrisoned by a small force under maj. Robert Anderson. The surrender being refused, the fort was attacked April 12, 1861, and thus actual hostilities begun. That act united the people of the north; party lines were broken down, and, with the exception of a few extreme proslavery men (afterwards known as "copperheads"), the whole people echoed the words of Jackson when South Carolina made her first attempt at secession—"The union must and shall be preserved." Maj. Anderson abandoned the fort on the 14th. The next day president Lincoln called a special session of congress to meet on the 4th of July; at the same time he called for 75,000 militia. The response was instantaneous. Massachusetts, with her sixth regiment, was first in the field. This regiment was attacked while going through Baltimore, and a number of its members were killed. On April 19 the president proclaimed the blockade of all the ports of the seceding states. The south was even more inflamed than the north; three days after the fall of Sumter the Virginia legislature voted to join the confederacy, and a few days later North Carolina followed her example. The confederates had raised 100,000 men, and made no secret of their design to capture the national capital and invade the north. On May 30 another call for men was issued by Lincoln, and both the army and the navy were speedily and largely reinforced. In a brief message to congress the president rehearsed the acts of rebellion, and said: "This issue embraces more than the fate of these United States. It presents to the whole family of man the question whether a constitutional republic or democracy—a government of the people by the same people—can or cannot maintain its territorial integrity against its own domestic foes." Some opposition was made in congress by members who thought it unconstitutional to "coerce a sovereign state," but the loyal sentiment overwhelmed them. July 15 a democratic member (McClernand of Ill.) offered a resolution pledging the house to vote any amount of money and any number of men necessary to suppress the rebellion and restore the authority of the government. There were only five opposing votes in a house of nearly 300 members. On July 21 the union forces were very badly defeated at Bull Run, and driven in a panic back upon Washington. The news gave the northern people a terrible shock, but it was only momentary, and its ultimate effect was to rouse to the highest pitch the patriotism and courage of the loyal states, and

volunteers came by thousands and thousands without waiting for a call. Up to the last of Oct. gen. Scott retained his position as commander of the army; but he was growing feeble, and was retired, gen. McClellan taking his place. The army was reorganized, new troops were drilled, and the whole force was soon in good discipline. But McClellan was loath to fight; though entirely loyal, he inclined to act with the moderate men on both sides, and whenever it seemed necessary to strike directly at slavery in order to sustain the republic he was not the man or the officer to do it. McClellan remaining inactive until near the end of Jan., 1862, the president, on the 27th of that month, ordered that on Feb. 22 a general movement by land and sea should be made against the confederates. McClellan objected, and nothing was done until at a council of war, held Mar. 13, it was decided to move against Richmond from fortress Monroe. Here again McClellan waited and hesitated, complaining that he was not properly supported at Washington, and after a number of battles, in which the unionists were generally beaten, he was forced to abandon the campaign and retreat. The close of the summer of 1862 was a dark period for loyal men, but no one suffered so keenly or worked so faithfully as did president Lincoln. The confederates now took the aggressive; Lee invaded Maryland, but was soon driven out after the first union victory at Antietam. To follow up this victory, McClellan was ordered to follow Lee and fight him or drive him southward. Again McClellan delayed, and finally broke the long-enduring patience of Lincoln, who removed him from command, Burnside taking his place. Battles with Lee followed at Fredericksburg and Chancellorville, in both cases unfortunate for the unionists. The people of the north began to feel that it was time to strike the rebellion in a vital part, and the emancipation of the slaves in the south was urged upon Lincoln, not only as a legitimate, but as a vitally necessary war-measure. He hesitated; thought such an act would drive the border slave states, still nominally loyal, into the confederacy. Again, what if the emancipated negroes should be taken into the confederate army? He said to the men who were urging the emancipation idea and adding that they felt sure it was the will of God: "I hope it will not be irreverent for me to say that, if it is probable that God would reveal his will to others on a point so connected with my duty, it might be supposed he would reveal it directly to me, for, unless I am more deceived in myself than I often am, it is my earnest desire to know the will of Providence in this matter; and if I can learn what it is, I will do it." In reference to the position of the slave-holding states still in the union he said: "There are 50,000 bayonets in the union army from the border slave states. It would be a serious matter if, in consequence of a proclamation such as you desire, they should go over to the rebels." Lincoln carefully sought the opinion of the northern people in the matter, and soon found that he would be sustained in the action questioned. Thus fortified he issued, on Monday, Sept. 22, 1862, the most important official document, the declaration of independence only excepted, known in American history; declaring that on and after Jan. 1, 1863, all slaves in states or parts of states then in rebellion should be free. Two years afterwards Lincoln said of the proclamation: "As affairs have turned it is the central act of my administration, and the great event of the 19th century." After the conflict at Chancellorville the current of success seemed to favor the union arms, leading on to the great event of July 4, 1863—the capture of Vicksburg by gen. Grant. At the same time the three-days' battle between the unionists under Meade and the confederates under Lee was going on near Gettysburg, resulting in a decisive union victory. Lincoln soon saw in Grant the man for the occasion, and in Mar., 1864, in compliance with the recommendation of congress, the captor of Vicksburg was appointed lieut.gen. of the armies of the United States. This sealed the fate of the rebellion. The rebels had fought long and bravely; but their resources failed, their losses were enormous, and those who lived were worn out. Sherman, almost unopposed, marched through an empty country to the sea; Grant, who knew no such word as fail, had set himself to the capture of Richmond, and would "fight it out on this line if it takes all summer." We need not follow details when the catastrophe is so near. On April 2, 1865, Lee was forced out of Richmond (then the confederate capital), and seven days afterwards was compelled to surrender his whole army to Grant at Appomattox. On the 17th, eight days later, gen. Joe Johnston surrendered to Sherman and the great struggle was ended; in fact, it ended with the surrender of Lee. Grant reached Washington on the 13th, met the president and secretary of war, and orders were prepared to stop the raising of recruits. The war was over and every loyal heart was rejoicing. Lincoln's praise was on every tongue; the patient man who had suffered the pain of a thousand deaths during the war; who had been misunderstood, maligned, and condemned, by friends as well as enemies, now shone conspicuous in popular affection. He had liberated a race; he had saved his country. On the evening of April 11 the White House was illuminated, and Lincoln made a short address expressing his acknowledgments to the army, and his gratitude to God, and then turning his remarks to reconstruction, the cardinal points of which he thought would be to grant universal amnesty on condition that the states lately in rebellion should grant universal suffrage. Lincoln and Grant were the idols of the hour. On the morning of the 14th they were invited to visit Ford's theater in the evening. Grant left the city, but the president, though not at all inclined, attended with his wife, and maj. Rathbone and Miss Harris. They went into a private box, and Lincoln was soon absorbed in the

play (*Our American Cousin*). At about 11:30 o'clock the box was suddenly invaded by John Wilkes Booth, an actor and a furious pro-slavery man. In an instant he put a pistol to the back of Lincoln's head and fired; then leaped from the box to the stage, crying, "*Sic semper tyrannis!* The south is avenged!" and fled through the stage door, mounted a horse, and escaped. The president did not stir; the ball had gone through his brain, and he had no further consciousness. He died the next morning about half-past seven. On the same evening an attempt was made to murder secretary Seward, who was confined to his house in consequence of an accident. It would be vain to attempt to describe the sorrow that spread over the nation, and even other nations, on hearing of this awful tragedy. The assassin was captured and executed, and some of his confederates shared the same fate. It is satisfactory to know that this act of infamy was the work of a gang of private men, and that the confederate government and leaders had no hand in it. Thus, when Lincoln

> Had mounted fame's ladder so high,
> From the round at the top he could step to the sky,

the great president passed to his rest. Twice elected to his high office—the last time (in Nov., 1864) over gen. McClellan by a popular majority of more than 400,000—he was torn from it in the moment of triumph to be placed side by side with Washington, the one the father, the other the savior of the union; one the founder of a republic, the other the liberator of a race.

LINCOLN, BENJAMIN, 1733–1810; b. Hingham, Mass. Until the age of 40 he was a farmer, but had filled the positions of local magistrate, representative in the colonial legislature, and col. of militia. In 1774–75 he took an active part in organizing the provincial militia for active resistance to the mother country, and was appointed maj.gen. of the Massachusetts militia. At the siege of Boston Washington put him in command of an expedition to force the British fleet out of Boston harbor. He commanded the Massachusetts militia at the battle of White Plains in the fall of 1776; reinforced Washington by a fresh levy of Massachusetts militia at Morristown, N. J., Feb., 1777; and by Washington's request was made a maj.gen. in the continental army, Feb. 19 of that year. He co-operated with gen. Schuyler in the summer campaign against Burgoyne in New York, and again organized reinforcements of New England militia for the army. In Sept. he joined gen. Gates as second in command, and was disabled by a wound Oct. 8 at the battle of Bemis Heights, near Saratoga. He resumed service in Aug., 1778, and in Sept. was assigned to the command of the southern army. His command of this division of the army was rather to strengthen the faltering allegiance of the Carolinas and Georgia to the cause of the states by a show of strength than for offensive operations. D'Estaing, admiral of the French fleet, was to co-operate with him near the coast. He arrived at Charleston Dec. 4, 1778, and maintained a defensive watch of the English forces. His army met with reverses at Brier creek and Stone ferry in Mar. and June, and, acting in conjunction with D'Estaing with a view to retake Savannah from the British, the combined forces met with a sanguinary repulse Oct. 9; and the following spring his army was besieged in Charleston and forced to capitulate May 12, 1780. He returned to his home prisoner on parole. Exchanged in the spring of 1781, he joined Washington before Yorktown, and was chosen by Washington to receive the sword of lord Cornwallis on his surrender. He held the office of secretary of war for three years, and retired to his farm at Hingham in 1784. Gen. Lincoln after this held various temporary positions of trust under the state of Massachusetts and the United States. In 1789 he was made collector of the port of Boston, which position he held till his death at the age of 87. He was a man of simple earnest character; and the persevering zeal and disinterestedness of his public service gave him great popularity in his native state and in New England. His services in organizing and drawing opportunely into service the militia of the several states were of great value, and so recognized by Washington.

LINCOLN, ENOCH, 1788–1829; son of Levi Lincoln (1749–1820); b. in Worcester, Mass.; studied at Harvard college; entered the legal profession in 1811, and settled at Fryeburg, Me., from which place he removed to the neighboring town of Paris in 1819. He was a member of congress from 1818 to 1826, and governor of Maine in 1827–29. During his residence at Fryeburg he described the beautiful scenery of that forest-town in a poem entitled *The Village*. He also delivered a poem at the centennial celebration of the fight at Lovewell's pond. He left historical manuscripts of value, some of which have been published in the first volume of the *Maine Historical Collections*.

LINCOLN, JOHN LARKIN, b. in Boston, 1817; professor of Latin in Brown university; editor of *Selections from Livy* (1847); the *Works of Horace* (1851); and Cicero's *De Senectute*.

LINCOLN, LEVI, 1749–1820; b. at Hingham, Mass., and graduated at Harvard in 1772; became a lawyer and settled at Worcester in 1775; was judge of probate in 1776; and served in the constitutional convention of 1780. In 1798 he was elected to congress as a political disciple of Jefferson, serving but for a single term. From 1801 to 1805 he was attorney-general of the United States; in 1807–8, lieutenant-governor of Massachusetts; and acting-governor in 1809. He declined an appointment as judge of the supreme court of the United States. Died at Worcester.

LINCOLN, LEVI, LL.D., 1782–1868; son of Levi Lincoln (1749–1820); b. in Worcester, and graduated at Harvard in 1802; entered the legal profession in 1805; served in the constitutional convention of 1820; often a member of the legislature, speaker of the house in 1822, president of the senate in 1845; elected lieutenant-governor of Massachusetts in 1823, and was governor from 1825 to 1834; was a member of congress from 1835 to 1841; a judge of the state supreme court in 1824; collector of the port of Boston from 1841 to 1843; and first mayor of Worcester in 1848.

LINCOLN COLLEGE, OXFORD, was founded in 1427 by Richard Fleming, bishop of Lincoln, for a rector and 7 fellows, and afterwards greatly augmented by Thomas Rotherham, bishop of Lincoln, archbishop of York, and lord high chancellor of England, who added 5 fellowships, and gave a new body of statutes in 1479, in which the election of fellows was limited to the dioceses of Lincoln, York, and Wells. These limitations were abolished, however, by an act of parliament, 17 and 18 Vict. The foundation at present consists of a rector, 10 fellows, and 14 scholars. Other scholarships are added from time to time from the proceeds of two suspended fellowships; 12 were founded by Dr. Hutchins, lord Crewe, bishop of Durham, and Dr. Radford, rectors. The patronage consists of 9 benefices, in the counties of Oxford, Lincoln, Essex, Dorset, and Bucks, of the annual value of £5,414. This college has usually between 250 and 300 members on the books.

LINCOLNSHIRE, a maritime county of England, and, after Yorkshire, the largest in the country, is bounded on the n. by Yorkshire, and on the e. by the North sea. Area, 1,767,962 statute acres; pop. '71, 436,599. The coast, from the Humber—which separates the county from Yorkshire on the n.—to the Wash, is almost uniformly low and marshy; so low, indeed, in one part—between the mouths of the Welland and the Nen—that the shore here requires the defense of an embankment from the inroads of the sea. Lincolnshire has long been divided into three districts, or "parts," as they are called—viz., the parts of Lindsey, an insular district, forming the north-eastern portion of Lincolnshire, and including the Wolds or chalk hills, which are about 47 m. in length by 6 m. in average breadth; the parts of Kesteven, in the s.w.; and the parts of Holland, in the s.e., including the greater part of the fens. Chief rivers, the Trent, the Ancholme, the Witham, and the Welland. The surface is comparatively level, with the exception of the Wolds in the north-east. The soil, though very various, is on the whole very fertile. It includes tracts of grazing-ground unsurpassed in richness, and the "warp-lands" (see WARPING) along the side of the Trent produce splendid crops of wheat, beans, oats, and rape without the aid of manure. No other county in England has finer breeds of oxen, horses, and sheep. Horncastle and Lincoln horse-fairs are frequented by French, German, Russian, and London dealers for the purpose of buying superior hunters and carriage-horses. The climate, though subject to strong westerly winds, is much the same as that of the other central counties of England. Six members are returned to parliament.

LINCOLN'S INN, one of the four English inns of court, having exclusive power to call persons to the bar. It is so called because it belonged to the earl of Lincoln in the reign of Edward II., and became an inn of court soon after his death in 1310. See INNS OF COURT.

LIND, JENNY. See GOLDSCHMIDT, MADAME.

LINDAU, a t. of Bavaria, built on islands in the lake of Constance; pop. about 5,000; the center of a small commerce in hops, wine, fish, and cheese. Its manufactures are mechanical and musical instruments, carriages, etc. In the 7th c. it was a well-known Roman town, and a free imperial city until 1803.

LIN'DE, SAMUEL BOGUMIL, 1771–1847; of Swedish descent; b. at Thorn, Prussia; studied at Leipsic; spent several years in Dresden and Vienna; and in 1803 was appointed director of the lyceum of Warsaw, where he died. His *Dictionary of the Polish Language,* in 6 vols., is highly esteemed.

LINDEN (tree). See LIME, *ante.*

LINDLEY, DANIEL, D.D., b. Penn.; graduated at the Ohio university, of which his father was president; taught school to pay his way through the Union theological seminary of Virginia, where he graduated in 1829; was immediately licensed to preach by the presbytery. For three years he preached in Charlotte, N. C., and saw several hundred added to the church. When an appeal was made by the American board for settled pastors to become missionaries, he offered his services. He married Lucy Allen of Richmond, Va., and sailed in 1834 for the cape of Good Hope. From Cape Town they journeyed by wagons 500 m. to Griqua Town, thence the next year 500 m. farther to Mosika, the country of Mosilikatse. After encountering great peril and suffering in the war between the Dutch and Mosilikatse, reduced almost to starvation, they reached Port Natal, whence shortly they were driven by war between the Dutch and Dingaan, great-uncle of Cetywayo. In June, 1839, he returned to Port Natal, where he labored among the Zulus for about thirty-five years. Not only did he make known to them Jesus Christ, but when the native Christians wished to improve their modes of life, though not a mechanic, he could show them how to make brick, to build houses, to construct a few implements and pieces of furniture. In sickness he ministered to them; if a tiger or

a lion threatened, his rifle never missed its aim; though he was neither physician nor sportsman. The Zulus honored and loved him. The Dutch Boers, whose wanderings he had shared when war drove him from his home and work among the natives, said, "If there be a human name that warms the heart of a Natal Teck Boer, it is the ever-to-be-remembered name of Daniel Lindley." He died at Morristown, N. J., Sept. 3, 1880.

LINDLEY, JOHN, a distinguished botanist, was b. Feb., 1799, at Catton, near Norwich, where his father, who was the author of *A Guide to Orchard and Kitchen Gardens*, owned a large nursery garden. Botany seems to have early attracted his attention, as, in 1819, he published a translation of Richard's *Analyse du Fruit*, and in 1820 his *Monographia Rosarum* appeared. Amongst his most important works are his *Introduction to the Natural System of Botany* (1830); *Introduction to the Structure and Physiology of Plants* (2 vols. 1832); *Flora Medica* (1838); and *The Vegetable Kingdom* (1846), which is a standard work on the subject of classification, and is an expansion of his *Introduction to the Natural System*, which had previously (in 1836) been remodeled under the title of *A Natural System of Botany*. Lindley did a great deal to popularize the study of botany by the publication of his *Ladies' Botany*, *School Botany*, "botany" in the *Library of Useful Knowledge*, and the botanical articles as far as the letter R in the *Penny Cyclopædia*. In his *Theory of Horticulture*, which has passed through several editions, and in the well-known periodical, *The Gardener's Chronicle* (the horticultural department of which he edited from its commencement in 1841), he showed the great practical value of a knowledge of vegetable physiology in the common operations of the field and garden. In conjunction with Mr. Hutton he published *The Fossil Flora of Great Britain*, which consists of descriptions and figures of all the fossil plants found in this country up to the time of the commencement of this publication in 1833. Our limited space prevents us from noticing his other works, or his numerous contributions to scientific transactions. In 1829, at the opening of the London university, he was appointed professor of botany, and he continued to discharge the duties of the chair till 1860, when he resigned. From 1822 he acted as assistant secretary to the horticultural society, and not only edited their Transactions and Proceedings, but took an active part in the management of their gardens at Turnham Green. He was a fellow of numerous learned societies at home and abroad. He died Nov., 1865.

LINDSAY, county-seat of Victoria co., Ontario, Canada, on the Scugog river, and on the line of the Canada Midland railway, 56 m. n.e. of Toronto; pop. about 4,000. Its commerce is principally in lumber, grain, and flour. Its manufactures are doors, sash and blinds, iron-works, beer, and extracts of hemlock bark. It contains the county buildings, and several fine churches and schools.

LINDSAY, THE FAMILY OF. This Scottish historical house is of Norman extraction. One of the race obtained lands in England from the Conqueror; another, sir Walter de Lindsay, settling in Scotland under David I., acquired Ercildoun, and Luffness in East Lothian. The descendant of the latter, William Lindsay of Ercildoun, high justiciary of Lothian in the latter half of the 12th c., acquired the lands of Crawford in Clydesdale, which the family continued to hold till about the close of the 15th century. He married princess Marjory, sister of king William the lion, and had three sons. The eldest inherited Crawford; and the descendants of the second were the house of Lamberton, who for a time eclipsed their elder brethren; but the line of both ended in heiresses; and Crawford eventually came to the descendants of William of Luffness, third son of the justiciary, who, in the 14th c., added largely to their estates by marriage with a coheiress of lord Abernethy. Sir James Lindsay of Crawford was one of the most notable of the Scotch barons engaged in the battle of Otterburn.

EARLS OF CRAWFORD AND DUKE OF MONTROSE.—Sir Alexander Lindsay, younger brother of sir James of Crawford, the hero of Otterburn, acquired large estates in the counties of Angus and Inverness by marriage with the heiress of Stirling of Glenesk and Edzell; and his son David, who, on failure of the line of his uncle, became chief of the family, married the sister of Robert III., and was raised by that king, in 1398, to the dignity of earl of Crawford. In the 15th c. the earls of Crawford were among the most powerful of the Scotch nobility: they assumed a regal state, had their heralds, and were attended by pages of noble birth. Their domains were widely extended over Scotland, but their chief seat was Finhaven, in Angus. David, third earl, entered into an alliance, offensive and defensive, with the eighth earl of Douglas and Macdonald of the Isles, earl of Ross, and wielded for a time, during James II.'s minority, an authority far exceeding that of royalty. He was slain at Arbroath in a private feud with the Ogilvies. His son, nicknamed "Beardie," or the "tiger earl," renewed the league with Douglas. On James having treacherously stabbed Douglas at an interview at Stirling, he rose in rebellion; and the earl of Huntly, lieut.gen. of the kingdom, who had aided the Ogilvies at Arbroath, took up arms against him. Earl Beardie was defeated at Brechin, and forfeited; but he was afterwards restored to his lands and dignities, and to royal favor, and entertained James at Finhaven, who flung down a loose stone from the castle battlement in fulfillment of a vow which he had taken to make the highest stone of the castle the lowest. The family attained their climax of power and wealth under David, fifth earl, a faithful friend of James III., and employed by him in his most important foreign embassies, who was made duke of Montrose in 1488, a title which had never before been

bestowed in Scotland but on princes of the blood-royal. On the accession of James IV., an act rescissory was passed of all grants and titles conferred by his predecessor during the last eight months of his reign; but soon afterwards, a new charter of the dukedom of Montrose was granted on a recital of the duke's good services to the king and his predecessor. David, eighth earl of Crawford, nephew of the duke of Montrose, had the misfortune to have a son known for his crimes and enormities as "the wicked master"; his conduct led his aged father to consent to a transfer of the earldom to David Lindsay of Edzell, the next heir. The ninth earl, who succeeded under this conveyance, moved with pity for the rightful heir, son of the "wicked master," obtained a reconveyance of the earldom to him after his own decease. From that time the fortunes of the family began to decline. The 12th earl was imprisoned by his relatives as a spendthrift. The 16th earl, a companion in arms of the great Montrose, having no issue, through the influence of a powerful cadet of the family, lord Lindsay of the Byres, a new patent of the earldom was obtained from Charles I., bringing in his branch of the house before the descendants of the uncle of the 16th earl, who had been created lord Spynie, or the intermediate cadets of Edzell and Balcarres.

Lord Lindsay of the Byres, Viscount Garnock.—Sir William Lindsay, younger brother of the first earl of Crawford, acquired extensive estates with his wife, a daughter of sir William Mure of Abercorn. He was hereditary bailie and seneschal of the regality of the archbishopric of St. Andrews, an office which remained in his family till the middle of last century. His grandson was made lord Lindsay of the Byres, county Haddington, in 1445. The lords Lindsay of the Byres were sturdy champions of popular rights and of the Presbyterian faith; their principal residence was Struthers castle in Fife. The fourth lord endeavored in vain to dissuade James IV. from his fatal expedition to England in 1513; in consequence of which, James vowed that, on his return, he would hang him on his own gate, a threat, of course, rendered futile by the fatal result of Flodden. The fifth lord was one of the four noblemen to whom the charge of the infant queen Mary was committed on the death of her father. The sixth lord, the fiercest and most bigoted of the lords of the congregation, was deputed by the rest to obtain Mary's compulsory resignation at Lochleven, an office which he is said to have discharged in a severe and repulsive manner; and the seventh lord bearded James VI. in the presence-chamber regarding the changes he was effecting in ecclesiastical polity. The tenth lord Lindsay of the Byres was in 1644 created earl of Lindsay; and in virtue of Charles I.'s above-mentioned patent, he became 17th earl of Crawford, a dignity enjoyed by his descendants till their extinction. He held the offices of high treasurer of Scotland, and an extraordinary lord of session; and though a warm partisan of the covenant, he was a loyal and consistent adherent of the Stuarts. In 1648 he entered with zeal into the proposal to raise an army to effect the king's rescue; and in 1657, while forwarding Charles II.'s plan of marching into England, he was arrested, carried to London, and detained a prisoner in the Tower and Windsor castle. He was released by the "long" parliament in 1660, on the recall of the secluded members, and was reinstated in his offices and dignities at the restoration. We find him afterwards making a strong effort to dissuade Charles from introducing episcopacy in Scotland. The treasurer's grandson by a younger son was created viscount Garnock in 1703. The fourth viscount Garnock succeeded as 21st earl of Crawford; his son, the 22d earl, was the last of the direct line of the Byres; and at his decease in 1808, the Crawford earldom returned, in terms of the patent of Charles I., to the line of Balcarres, while the Crawford Lindsay estates went to heirs-female. A claim by an alleged descendant of this branch of the house to both peerage and estates, was long a matter of public interest and notoriety; it eventually collapsed from the discovery that the principal documents founded on were ingeniously contrived forgeries.

Sir David Lindsay of the Mount, lion king of arms, the courtly knight, poet, and philosopher, and friend of the reformation in its earlier stages, was descended from a natural son of the first sir William Lindsay of the Byres.

Earl of Balcarres and Crawford.—The Lindsays of Balcarres, in Fife, were a branch, and eventually the representatives of the Lindsays of Edzell, who, as already seen, had temporarily possessed the earldom of Crawford on the attainder of the "wicked master." The first of them was lord Menmuir, a lord of session and secretary of state to James VI., possessed of accomplishments and cultivation rare in his age. His son David was created lord Lindsay of Balcarres in 1633, and his grandson, Alexander, earl of Balcarres, in 1651, in reward of their steady support of the royal cause. The sixth earl of Balcarres became *de jure* earl of Crawford on the death of the 22d earl, the last of the Byres line; and that title has been recognized by the house of lords to belong to his son, James, seventh earl of Balcarres, and 23d earl of Crawford, father of the present representative of the family. The earl of Crawford further preferred without success a claim to the dukedom of Montrose, conferred by James III. Alexander William Crawford, since 1869 earl of Crawford and Balcarres, is author of *Sketches of the History of Christian Art* (1847); *Skepticism* (1861); *On the Theory of the English Hexameter; Œcumenicity in relation to the Church of England* (1870); and (1849) *Lives of the Lindsays*, a family memoir, combining to a rare extent genealogical research with biographical interest, to which reference is made for further particulars regarding the Lindsays.—See also Jervise, *Land of the Lindsays*.

LINDSAY, WILLIAM SCHAW; b. in Ayrshire, Scotland, in 1816; went to sea as cabin-boy at 15 years of age; was second mate in 1834, chief mate in 1835, and commander of a merchantman in 1836; became agent for the Castle-Eden coal company in 1841; took an active part in opening the port of Hartlepool and providing it with wharves and docks; in 1845 went to London, where in a short time he was recognized as one of the "merchant princes" of the city; was a candidate for parliament in 1852, and defeated; but in 1854 elected for Tynemouth and North Shields, and re-elected without opposition in 1857; two years later was elected for Sunderland. He distinguished himself in parliament by earnest, careful attention to commercial and shipping interests, and took part in organizing the administrative reform association. Besides numerous pamphlets on mercantile and political topics he has published *Our Navigation, Mercantile, and Marine Laws Considered; Our Merchant Shipping;* and *The History of Merchant Shipping,* the latter a work in 2 volumes.

LINDSAY, or LYNDSAY, Sir DAVID, OF THE MOUNT, one of the best and long the most popular of the older Scottish poets, was the son of David Lindsay of Garmylton, in East Lothian, whose grandfather was a son of sir William Lindsay of the Byres. The poet is said by Chalmers to have been born at the Mount about the year 1490, but Laing in his recent edition of Lyndsay (1871) notes the absence of evidence on this point, Chalmers having apparently assumed it as a consequence of his supposition that the poet's father was "David Lyndsay of the Mounthi," while Laing has shown that this was the poet's grandfather. The name "Da Lindesay" occurs in the list of "incorporated" students in St. Salvator's college, St. Andrews, for the year 1508 or 1509. It may be that of the poet. We cannot tell when he entered the royal service, but in Oct., 1511, he is found taking part in a play acted before the court of king James IV. In the following spring he was appointed "keeper" or "usher" of the prince, who, when little more than a twelvemonth old, became king James V.; and his verses preserve some pleasing traces of the care and affection with which he tended the king's infant years. His wife, Janet Douglas, had long the charge of the royal apparel. In 1524 the court fell under the power of the queen-mother and the Douglases, and Lindsay lost his place; but four years afterward, when the Douglases were overthrown, Lindsay was made lion king at arms, and at the same time received the honor of knighthood. In this capacity he accompanied embassies to the courts of England, France, Spain, and Denmark. He appears to have represented Cupar in the parliaments of 1542 and 1543; and he was present at St. Andrews in 1547, when the followers of the reformed faith called Knox to take upon himself the office of a public preacher. He died childless before the summer of 1555.

The first collection of Lindsay's poems appeared at Copenhagen about 1553. They were republished at Paris or Rouen in 1558; at London in 1566, 1575, and 1581; at Belfast in 1714; in Scotland in 1568, 1571, 1574, 1588, 1592, 1597, 1604, 1610, 1614, 1634, 1648, 1696, 1709, 1720, and 1776. This mere enumeration of editions might be enough to show the great popularity which Lindsay long enjoyed. For nearly two centuries, indeed, he was what Burns has since become—the poet of the Scottish people. His works were in almost every house, his verses on almost every tongue. Like Burns, he owed part of his popularity, no doubt, to his complete mastery of the popular speech. But, like Burns, Lindsay would have been read in whatever language he chose to write. His verses show few marks of the highest poetical power, but their merits otherwise are great. Their fancy is scarcely less genial than their humor, and they are full of good sense, varied learning, and knowledge of the world. They are valuable now, if for nothing else than their vivid pictures of manners and feelings. In the poet's own day, they served a nobler purpose, by preparing the way for the great revolution of the 16th century. It has been said that the verses of Lindsay did more for the reformation in Scotland than all the sermons of Knox. Like Burns, Lindsay shot some of his sharpest shafts at the clergy. The licentiousness that characterizes his verses must be attributed in part to the age in which he lived. The earliest and most poetical of his writings is *The Dreme;* the most ambitious, *The Monarchie;* the most remarkable in his own day, perhaps, was *The Satyre of the Thrie Estaitis;* but that which is now read with most pleasure, both for the charm of its subject and for its freedom from the allegorical fashion of the time, is *The Historie of Squyer Meldrum.* An admirable edition of Lindsay's works is that of Chalmers (Lond. 1806, 3 vols.); but in points of detail it is less accurate than that of Laing (Edin. 1871, 2 vols.).

LINDSLEY, PHILIP, D.D., 1786–1855; b. at Morristown, N. J.; graduated at Princeton in 1804, where he was tutor in 1807–9 and 1812, professor of languages in 1813, and vice-president in 1817, at which time he was ordained as a minister of the Presbyterian church. Between 1820 and 1839 he was offered the presidency of 10 different colleges, and in 1824 accepted that of the university of Nashville, Tenn., which he held till 1850, when he resigned, after a very successful career. He subsequently held the professorship of archæology and church polity in the Presbyterian theological seminary at New Albany, Ind. His complete works, comprising sermons and educational and other discourses and essays, together with a memoir by Leroy J. Halsey, were published in 1865. Died at Nashville.

LINE, an expression used in the army to distinguish ordinary cavalry and infantry from the guards, artillery, and engineers. It obviously takes its origin from the fact that the troops in question constituted the usual "line of battle."

LINE, in military or naval rank (*ante*). The line-officers of the navy and army in the United States are divided into eleven grades, and their comparative rank on the active or retired list is as follows:

The admiral of the navy ranks with a general of the army.				
The vice-admiral	"	"	lieutenant-general of the army.	
10 rear-admirals of the navy rank with			major-generals	"
25 commodores	"	"	brigadier-generals	"
50 captains	"	"	colonels	"
90 commanders	"	"	lieutenant-colonels	"
80 lieutenant-commanders	"	"	majors	"
280 lieutenants	"	"	captains	"
100 masters	"	"	first lieutenants	"
100 ensigns	"	"	second lieutenants.	"
— midshipmen				

All staff officers are appointed by the president with the sanction of the senate. He also appoints for vessels in actual service all warrant officers, such as boatswains, gunners, sail-makers, and carpenters, that may be required. All officers not entitled to hold warrants are called petty officers. All officers of the army above the grade of sergeant hold their authority by commissions, and are therefore termed commissioned officers, to distinguish them from non-commissioned officers.

LINE, MATHEMATICAL, denotes a magnitude having only one dimension. Euclid defines it to be "that which has length without breadth."

LINE, MATHEMATICAL (*ante*), may be straight, curved, or mixed; a straight line is defined by Euclid as "one which lies evenly between two points." To this, it is objected, the idea of straightness is presupposed in the definition; it is said, also, by some mathematicians that the order of definitions is reversed by Euclid from the order of comprehension; that the mind conceives first the solid and then successively the surface, line, and point. The definition now generally given is that a straight line is the *shortest* path between any two given points; a curved line is one not straight, i.e. between any two geometrical points in its extent a shorter line may be drawn; the term mixed line is used to denote a union of the two in extent, but is hardly a pure geometrical concept. Straight lines may be produced both ways without limit; may be drawn through any two points in space, and any two coincide throughout indefinite extension if two points in the one coincide with two points in the other. If we admit the idea of motion, we may define a line as the path of a moving point, a surface as the path of a moving line, and a solid as that of a moving surface. Thus if a straight line revolves about one extremity as an axis, it will describe with the other a circle of which it is itself the radius; and a semicircle revolving about its diameter will produce a spherical surface.

LINEAL DESCENT, the descent in a right line, as from father to son, grandson, etc.

LINEN AND LINEN MANUFACTURES, fabrics manufactured wholly from flax or lint (Lat. *linum*). The manufacture of linen has reached its greatest perfection in France and the Netherlands, where the stimulus to produce fine yarns (see SPINNING) for the lacemakers has given rise to such care and attention in the cultivation and preparation of flax that in point of fineness of fiber they have been unequaled. Consequently the linens of France, Belgium, and Holland have long enjoyed a well-deserved reputation, and in the article of lawn, which is the finest kind of linen cloth made, the French are unrivaled. In the ordinary kinds of linen our own manufactures are rapidly improving, and will soon equal in quality the productions of continental competitors. Those of Ireland, especially, are remarkable for their excellence, and this trade has become a very important one in that country; whilst in Scotland a large trade in the coarser and inferior kinds has located itself. The export of linen manufactures and linen yarns from the United Kingdom in 1876 was in value £7,070,149; and the amount produced for home-consumption may be reckoned at £10,000,000.

The chief kinds of linen manufactures, besides yarn and thread, which will be described under SPINNING, are: LAWN (Fr. *linon*), the finest of flax manufactures, formerly exclusively a French production, but very fine lawns are now made in Belfast, Armagh, and Warringstown; cambric (q.v.); damask (q.v.); diaper (q.v.). Of the finer plain fabrics, *sheetings* are the most important in this country. The chief places of their manufacture are Belfast, Armagh, and Leeds. Common *sheeting* and *toweling* are very extensively manufactured in Scotland, particularly at Dundee, Kirkcaldy, Forfar, and Arbroath. *Ducks*, *huckabacks*, *osnaburgs*, *crash*, and *tick* (corrupted from *ticken* and *dekken*, Dutch for cover) are very coarse and heavy materials, some fully bleached, others unbleached or nearly so. They are chiefly made in Scotland, the great seat of the manufacture being at the towns just mentioned, although much is made in the smaller towns and villages, also at Leeds and Barnsley in England. Some few varieties

of velvet and velveteen are also made of flax at Manchester, and much linen-yarn is used as warp for other materials.

Linen is one of the most ancient of all textile manufactures, at least it is one of the earliest mentioned. The cerecloth, in which the most ancient mummies are wrapped, proves its early and very extensive use among the Egyptians. It formed also parts of the garments of the Hebrew as well as the Egyptian priests. Panopolis was the Belfast of the ancients, as, according to Strabo, it was there the manufacture of linen was chiefly conducted. The wonderful durability of linen is evidenced by its existence on mummies, and by the remarkable fact mentioned by the German writer, Seetzen, and referred to by Blumenbach, that he had found several napkins within the folds of the covering on a mummy which he unwrapped, and that he had them washed several times without injury, and used with great veneration "this venerable linen, which had been woven more than 1700 years." From the time of these ancient Egyptians up to the present period, the use of linen for clothing and other purposes has been continuous; and although the introduction and vast development of the cotton manufacture checked its consumption for a time, it has fully regained, and has indeed exceeded, its former proportions as one of our great staples.

LINEN AND LINEN MANUFACTURES (*ante*). Linen was first manufactured in England by Flemish weavers under the protection of Henry III., in 1253; it was not until 80 years after, that a colony of Scots planted themselves in the n.e. part of Ireland, and established there the linen manufacture. In 1696 hemp, flax, linen-thread, and yarn were permitted to be exported from Ireland duty free: it was not before 1860 that the duty was taken off imported linen.—The introduction of the linen manufacture into the United States took place in 1834, when a mill was set up at Fall River, Mass. As late as 1870 there were but 10 establishments for this manufacture in the United States, their product being set down at $2,178,775. The importation into the United States in the year ending June 30, 1879, of flax and manufactures of flax, jute and its manufactures, and hemp, amounted to $23,157,769.

LING, *Lota molva*, a fish of the family *gadidæ*, abundant on most parts of the British coasts, and elsewhere throughout the northern seas, and in value almost rivaling the cod. In form it is much more elongated than the cod, and even more than the hake, with which it agrees in having two dorsal fins and one anal fin, the anal and second dorsal long; but the genus differs in the presence of barbels, of which the ling has only one at the extremity of the lower jaw. The ling is generally 3 or 4 ft. long, sometimes more, and has been known to weigh 70 pounds. The color is gray, inclining to olive; the belly, silvery; the fins edged with white. The tail-fin is rounded. The gape is large, and the mouth well furnished with teeth. The ling is a very voracious fish, feeding chiefly on smaller fishes. It is also very prolific, and deposits its spawn in June, in soft oozy ground near the mouths of rivers. It is found chiefly where the bottom of the sea is rocky. Great numbers are caught in the same manner as cod, by hand-lines and long lines, on the coasts of Cornwall, the Hebrides, the Orkney and Shetland islands, etc.; and are split from head to tail, cleaned, salted in brine, washed, dried in the sun, and sent to the market in the form of *stock-fish*. They are largely exported to Spain and other countries. The air-bladders or *sounds* are pickled like those of cod. The liver also yields an oil similar to cod-liver oil, which is used for the supply of lamps in Shetland and elsewhere.—Other species of ling are found in the southern seas.—The burbot (q.v.) is a fresh-water species of the same genus.

LING. See HEATH (*ante*).

LING, PETER HENRIK, 1776–1839; b. in Sweden; of an adventurous spirit, he traveled as a young man through Germany and France; was fencing-master at the university of Lund in 1805, in 1813 teacher of fencing at the military school of Carlesberg, and in 1816 director of the gymnastic institute of Stockholm, where he died. He bestowed much thought and labor upon his profession, developing gymnastic exercises as a form of medical treatment, leading finally to what is now extensively known as the "Swedish movement cure." His poetical works, which appeared from time to time, were addressed to the patriotism of the Swedes, and well calculated to inspire in them a deep love of country and a heroic determination to defend it at all hazards.

LINGA (a Sanskrit word which literally means a sign or symbol) denotes, in the sectarian worship of the Hindus, the *phallus*, as emblem of the male or generative power of nature. The Linga-worship prevails with the Sai'vas, or adorers of Si'va (see Hindu Religion under INDIA). Originally of an ideal and mystical nature, it has degenerated into practices of the grossest description; thus taking the same course as the similar worship of the Chaldeans, Greeks, and other nations of the east and west. The manner in which the Linga is represented is generally inoffensive—the pistil of a flower, a pillar of stone, or other erect and cylindrical objects, being held as appropriate symbols of the generative power of Si'va. Its counterpart is *Yoni*, or the symbol of female nature as fructified and productive. The Si'va-Purâna names 12 Lingas which seem to have been the chief objects of this worship in India.

LINGAN, JAMES MACCUBIN, 1752–1812; b. in Maryland, and took an active part in the war of the revolution, rising to the rank of brig-gen.; was one of the prisoners at

fort Washington, and kept for a long time in the prison-ship; after the war, was collector of the port of Georgetown, Md.; resided in Baltimore in 1812, where he was killed, July 28, by a mob while bravely defending the printing-office of the *Federal Republican*.

LINGARD, JOHN, D.D., a member of a humble Roman Catholic family, was b. at Winchester, Feb. 1, 1771; and being destined for the priesthood of that church, was sent to the English college of Douai, in France, where he remained till that college, in common with most of the religious establishments of France, was broken up by the troubles of the revolution. The act called the Catholic relief act enabling Catholics to open schools in England, the Douai community was transferred to Crookhall, and ultimately to Ushaw, in the county of Durham. Lingard continued attached to the college in its several migrations, although not always resident. In 1793 he accepted the office of tutor in the family of lord Stourton; but in the following year he returned to complete his theological studies at Crookhall, where he entered into priest's orders, and in which he continued as professor of philosophy, prefect of studies, and vice-president, until 1810, when he was named president. In 1811, however, he accepted the humble cure of Hornby, near Lancaster, in which he continued to reside till his death, July 13, 1851. Lingard's first important work was the *Antiquity of the Anglo-Saxon Church* (8vo, 1806), reprinted in 1810, and afterwards, in a much enlarged edition (2 vols. 1845). This was but the pioneer of what became eventually the labor of his life—a *History of England* (6 vols. 4to), published at intervals, 1819–25; and afterwards in 14 vols. 8vo, 1823–31. This work, before the death of the author, had passed through six editions, the last of which (10 vols. 8vo) appeared in 1854–55. From its first appearance, it attracted much attention, as being founded on original authorities and the result of much new research. It was criticised with considerable asperity in its polemical bearings; but the author, in his replies, displayed so much erudition, and so careful a consideration of the original authorities, that the result was to add materially to his reputation as a scholar and a critic. It won for itself a place as a work of original research, and although it bears unmistakable evidence of the religious opinions of the author, yet there is also evidence of a sincere desire to investigate and to ascertain the truth of history. In recognition of his great services, many honors were offered to him; and he received a pension of £300 from the crown in reward of his literary services. His remains were interred in his old college of St. Cuthbert, at Ushaw.

LINGAYEN', a t. of the island of Luzon, Philippine islands (q.v.), on a bay of the same name. Pop. 23,063, who export rice and sugar.

LINGUA FRANCA, a kind of corrupt Italian, with a considerable admixture of French words and idioms; spoken along the shores of the Mediterranean.

LINGUAGROS'SA, a t. of Sicily, in the province of Catania, on the north-eastern slope of Mt. Etna, 1725 ft. above the sea, 37 m. s.w. from Messina. The name is also frequently spelt Linguaglossa. The pop. of the town at the census of 1871 was close on 8,500.

LINGUISTICS. See PHILOLOGY, *ante*.

LING'ULA, a genus of brachiopodous mollusks, exhibiting the remarkable peculiarity of a long fleshy pedicel supporting a bivalve shell, and passing between the beaks of the valves. They live attached to rocks in the seas of warm climates, particularly of the Indian archipelago and Polynesia. The genus is interesting, because, although few recent species are known, fossil species are numerous, and are found in the fossiliferous beds of Britain and other countries, the seas of which now produce none of their congeners.

LINIMENTS (from the Latin word *linīre*, to besmear) may be regarded, in so far as their physical properties are concerned, as ointments having the consistence of oil, while, chemically, most of them are *soaps*—that is to say, compounds of oils and alkalies. In consequence of their slighter consistence, they are rubbed into the skin more readily than ointments. Among the most important of them are: *Liniment of ammonia*, popularly known as *hartshorn and oil*, which is prepared by mixing and shaking together solution of ammonia and olive-oil, and is employed as an external stimulant and rubefacient to relieve neuralgic and rheumatic pains, sore throat, etc.: *Soap liniment*, or *opodeldoc*, the constituents of which are soap, camphor, and spirits of rosemary, and which is used in sprains, bruises, rheumatism, etc.: *Liniment of lime*, or *carron oil*, which is prepared by mixing and shaking together equal measures of olive or linseed oil and lime-water; it is an excellent application to burns and scalds, and from its general employment for this purpose at the Carron iron-works, has derived its popular name: *Camphor liniment*, consisting of camphor dissolved in olive-oil, which is used in sprains, bruises, and glandular enlargements, and which must not be confounded with *compound camphor liniment*, which contains a considerable quantity of ammonia, and is a powerful stimulant and rubefacient: *Opium liniment*, which consists of soap liniment and tincture of opium, and is much employed as an anodyne in neuralgia, rheumatism, etc.; and the *simple liniment* of the Edinburgh Pharmacopœia, which is composed of four parts of olive-oil, and one part of white wax, and is used to soften the skin and promote the healing of chaps.

LINK, a unit of measure in land surveying, $7\frac{92}{100}$ in. in length.

LINKÖPING (old Norse *Longaköpungar*, later *Liongakiöping*), one of the oldest towns in Sweden, capital of the læn of the same name, is situated on the Stänga, which here flows into lake Roxen, 110 m. s.w. of Stockholm. It is regularly built, with fine market-places and public squares, but the houses are mostly of wood. Linköping has three churches, of which the cathedral—a Gothic edifice of the 12th c., containing monuments of many illustrious personages—is one of the most beautiful in Sweden. It also possesses a library of 30,000 vols. Its trade is considerable. Pop. '76, 8,373. In old heathen times, Linköping was a place of sacrifice.

LINLEY, THOMAS, 1725–95; b. Wells, Eng.; was the pupil first of Chilcot, organist of the Abbey at Bath, and finished his studies under Paradies, an eminent Venetian; established himself in Bath, teaching music, and giving concerts, his two daughters Mrs. Sheridan and Mrs. Tickell contributing greatly to the attraction by their superior singing; removed to London, to conduct the oratorios, first in connection with Stanley, then with Dr. Arnold. Christopher Smith having retired from the management of the London oratorios, Mr. Linley succeeded him in connection with Mr. Stanley, the blind composer, and on his death with Dr. Arnold. In 1775 he set the music to Sheridan's opera *The Duenna*, which had unparalleled success, having been performed 75 times that season. He united in 1776 with Sheridan in purchasing an interest in the Drury Lane theater, Linley having direction of the musical department, which he conducted for 12 years. Among other pieces he produced *Carnival of Venice; Selima and Azor* from the French. His *Six Elegies*, written early in life, were original, simple, and beautiful, and did much for his fame and fortune. His twelve ballads and a madrigal have great merit. The death of his son Thomas by drowning at the age of twenty-two affected him so deeply that he never recovered from the shock. The son had made great proficiency in music with the best masters of Italy and Germany, and lived in the closest intimacy with Mozart.

LINLEY, WILLIAM, 1767–1835; son of Thomas; educated at Harrow and St. Paul's schools. For several years he was in the service of the East India company at Madras and Calcutta. He returned from India early with a competence, and devoted the remainder of his life to literature and music. Of music he was passionately fond, and produced a number of glees which evinced much originality and taste. He published also a set of songs, two sets of canzonets, and many detached pieces, and compiled *Dramatic Songs of Shakespeare*, 2 folio volumes, a work of much research, in which are several of his own elegant compositions. He wrote also two novels, and two comic operas which were performed at Drury Lane. He wrote besides an elegy on the death of his sister Mrs. Sheridan.

LINLITHGOW, or WEST LOTHIAN, a co. in Scotland, is bounded on the n. by the firth of Forth, having the counties of Mid-Lothian, Lanark, and Stirling on the e., s., and west. Its length, n. to s., is 20 m., and e. to w. 15 miles. Its area is 127 sq.m., or 81,114 acres. The surface of the ground is irregular, but the hills are inconsiderable with the exception of one eminence 1500 ft. high. The climate is changeable, but healthy. The soil is very varied, and, except along the borders of the firth, there is little land of first quality. In some of the high grounds there is good pasture, also a considerable breadth of unreclaimed moss. Excellent farming prevails here as in Edinburghshire and Haddingtonshire. There are few streams of any note, the Almond and Avon being the principal. The minerals are of considerable value. The freestone used in building the royal institution, national gallery, and other public buildings in Edinburgh, was got at Binny. There are several collieries in full and profitable operation.

There are two royal burghs—Linlithgow, the county town, and Queensferry. The other principal towns are Bathgate and Borrowstounness. This county is intersected with railways, and the Edinburgh and Glasgow Union canal traverses it for upwards of 10 miles. In 1674 the valued rent was £5,073. In 1811 the real rent was £88,745; and in 1878–79 it was, excluding railways and canals, £197,623.

The following are the agricultural statistics for 1876: acres under a rotation of crops and grass, 58,378, of which there were 1362 acres of wheat, 5,146 acres of barley, 10,761 acres of oats, 916 acres of beans, 2,210 acres of potatoes, and 4,683 acres of turnips. Of live-stock, the numbers were—horses employed in agriculture, 2,140; cattle, 10,902; sheep, 19,906; swine, 1858. Salt is made in the county; and in the towns are tanneries, breweries, distilleries, and chemical works. This county contains several remains of Roman antiquities. Pop. '71, 40,965. Constituency in 1876–77, returning one member to parliament, 1193.

LINLITHGOW, a market-town, and royal and parliamentary burgh of Scotland, chief t. of the co. of the same name, is situated on a small lake, 16 m. w. of Edinburgh. It is one of the oldest towns in Scotland, and, though it has been much modernized, still contains many antiquated houses, and some ruins rich in historical association. The parish church of St. Michael's (built partly in the 15th and partly in the 16th c.), a portion of which is still in use, is a beautiful specimen of the latest Scottish Gothic. The palace, strikingly situated on an eminence which juts into the lake (of 102 acres), dividing it into two almost equal parts, is heavy, but imposing in appearance; was frequently the

residence of the Scottish monarchs, and was the birthplace of Mary Queen of Scots, and of her father, James V. The earliest record of its existence is of the time of David I. (1124–53), and fragments of various ages are easily detected. The latest work is of the time of James VI. Linlithgow unites with several other burghs in sending a member to parliament. Pop. '71, 3,690.

LINN, a co. of e. Iowa, intersected by the Cedar and Wapsipinicon rivers, and drained in part by Buffalo and Prairie creeks; traversed by the Chicago and North-western, the Dubuque and South-western, and the Burlington, Cedar Rapids and Minnesota railroads; 720 sq.m.; pop. '80, 37,235. The surface is undulating, and diversified with prairies and forests, the latter filled with hard timber. The soil is fertile and well watered, and rests partly upon a limestone foundation. Wheat, corn, oats, hay, butter, cattle, and pork are staple products. The city of Cedar Rapids is in the county. Valuation of real and personal property, $15,412,248. Capital, Marion.

LINN, a co. in e. Kansas, bordering upon Missouri; intersected by the Osage river, and drained in part by Big Sugar and North Sugar creeks; traversed by the Mississippi River, Fort Scott and Gulf railroad; 630 sq.m.; pop. '80, 15,299. About 90 per cent of the surface is prairie, while forests grow along the streams. The soil is fertile, producing excellent crops of wheat, corn, oats, and hay. Large numbers of cattle are raised, and butter is a staple production. Limestone and bituminous coal abound. Valuation of real and personal property, $5,002,650. Capital, Mound City.

LINN, a co. in n. Missouri, intersected by Locust and Yellow creeks, and drained by Muscle river, and several affluents of Grand river, which touches the s.w. corner of the county; traversed by the Hannibal and St. Joseph railroad; 648 sq.m.; pop. '80, 20,016, of whom 14,499 were of American birth. The surface is undulating, and much of it is covered with forests. The soil is fertile, and the chief staples are corn, oats, wheat, cattle, and pork. Valuation of real and personal property, $6,500,000. Capital, Linneus.

LINN, a co. in w. Oregon, bounded n. by the n. fork of the Santiam river, and w. by the Willamette; drained by the Calapooya river and the s. fork of the Santiam; intersected by the Oregon and California railroad; 2,350 sq.m.; pop. '80, 12,675, of whom 8,474 were of American birth. The surface is diversified with mountains, prairies, and extensive forests. Mount Jefferson, a high peak of the Cascade range, covered with perpetual snow, stands on the e. border of the county. The soil of the valleys and prairies is very productive. The chief productions are wheat, oats, butter, hay, lumber, and wool. The quantity of wheat raised in 1875 was 998,626 bushels. Valuation of real and personal property, 5,500,000. Capital, Albany.

LINN, JOHN BLAIR, D.D., 1777–1804; b. in Shippensburg, Penn., but removed in childhood to New York; graduated at Columbia college in 1795, when but 17 years old, and was afterwards a student in the law office of Alexander Hamilton. A "serious drama," written by him and entitled *Bourville Castle, or the Gallic Orphan*, was brought out at the John street theater, in 1797, but was not successful. Not long after this he abandoned the law and studied theology under the rev. Dr. Romeyn at Schenectady. In June, 1799, he became assistant pastor of rev. Dr. Ewing's church in Philadelphia. In 1800 he wrote a poem on the *Death of Washington*, and in 1802 published *The Powers of Genius*, a poem of about 600 lines, which was well received, soon reaching a second edition, and being reprinted in England. In 1803 he entered into controversy with Dr. Priestley, occasioned by the latter's comparison of Socrates with Jesus. He conducted his side of the debate so well that the university of Pennsylvania conferred upon him the title of D.D. Died in Philadelphia of consumption.

LINN, WILLIAM, D.D., 1752–1808; b. near Shippensburg, Penn.; graduated at Princeton in 1772; studied theology with the rev. Dr. Cooper of Middle Spring, Penn., and licensed to preach in 1775. He served for a time as a chaplain in the revolutionary war, afterwards taught an academy at Somerset, Md., became pastor of a church in Elizabethtown, N. J., in 1786, and a few months later, one of the pastors of the collegiate Dutch reformed church in New York, where he remained until 1805, when the state of his health compelled him to retire. He was distinguished as an eloquent and successful preacher. He published *Discourses on Scripture History; The Signs of the Times*, a series of essays in favor of the French revolution; a *Funeral Eulogy of Gen. Washington*, and many separate sermons. Died at Albany.

LINNÆ'A, a genus of plants belonging to the order caprifoliaceæ or honeysuckle family. It contains only one species, *L. borealis*. It was found by Linnæus in Lapland in 1732 and named after him by Gronovius. Calyx 5-pointed, oval-shaped, deciduous. Corolla narrow, bell-shaped, five-lobed. Stamens four, two shorter, inserted towards the base of the corolla. Pod, three-celled, but having only one seed, the other two cells having abortive ovules. It is a slender creeping and trailing little evergreen, somewhat hairy, rounded oval leaves contracted at the base into short petioles, and thread-like upright peduncles having two pedicels at the top, each bearing a delicate and fragrant nodding flower. Corolla purple and whitish, hairy inside. It inhabits the more northern parts of Europe, Asia, and America—found in moist, mossy woods and cold bogs;

British America and northern United States; and grows somewhat rarely in New Jersey and in the mountainous parts of Maryland.

LINNÆ'US. See LINNÉ, *ante*.

LINNÉ, KARL VON, often called LINNÆUS, one of the greatest of naturalists, was b. May 4, 1707, at Rashult, in Smaland (Sweden), where his father was a country parson in very poor circumstances. His parents intended him for his father's profession, but he made little proficiency in the necessary classical studies, manifesting, however, from his very boyhood, the greatest love for botany. His father, disappointed, proposed to apprentice him to a shoemaker; but Dr. John Rothmann, a physician at Wexiö, a friend of his father, undertook for a year the expense of his education, and guided him in the study of botany and of physiology. In 1727 the young naturalist went to study medicine at Lund, and in the year following he went to Upsala, but during his attendance at the university he endured great poverty. Olaf Celsius received him at last into his house, and availed himself of his assistance in preparing a work on the plants of the Bible. He also won the favorable regard of Olaf Rudbeck, the professor of botany at Upsala, by a paper in which he exhibited the first outlines of the sexual system of botany, with which his name must ever remain connected. Rudbeck appointed him curator of the botanic garden and botanical demonstrator. In his 24th year he wrote a *Hortus Uplandicus*. From May to November, 1732, he traveled in Lapland, at the expense of the government. The fruits of this tour appeared in his *Flora Lapponica* (Amst. 1737). He afterwards spent some time at Fahlun, studying mineralogy, and there he became acquainted with the lady whom he afterwards married, the daughter of a physician named Moräus, who supplied him with the means of going to Holland to take his degree, which he obtained at Harderwyck in 1735. In Holland he became the associate of some of the most eminent scientific men of the time, and won for himself a high reputation as a naturalist, developing original views which attracted no little attention, while he eagerly prosecuted his researches in all departments of natural history. During his residence in Holland Linné composed and published, in rapid succession, some of his greatest works, particularly his *Systema Naturæ* (Leyd. 1735), his *Fundamenta Botanica* (Leyd. 1736), his *Genera Plantarum* (Leyd. 1737), his *Corollarium Generum Plantarum* (Leyd. 1737), etc. He visited England and France, and returned to Sweden, where, after some time, he was appointed royal botanist and president of the Stockholm academy. In 1741 he was appointed professor of medicine in Upsala, and in 1742 professor of botany there. The remainder of his life was mostly spent at Upsala in the greatest activity of scientific study and authorship. He produced revised editions of his earlier works, and numerous new works, a *Flora Suecica* (1745), *Fauna Suecica* (1746), *Hortus Upsaliensis* (1748), *Materia Medica* (1749–52), his famous *Philosophia Botanica* (1751), and the *Species Plantarum* (1753), in some respects the greatest of all his works. He died Jan. 10, 1778, the last four years of his life having been spent in great mental and bodily infirmity. Linné was not only a naturalist of most accurate observation, but of most philosophical mind, and upon this depended in a great degree the almost unparalleled influence which he exercised upon the progress of every branch of natural history. Among the important services which he rendered to science, not the least was the introduction of a more clear and precise nomenclature. The groups which he indicated and named have, in the great majority of instances, been retained amid all the progress of science, and are too natural ever to be broken up; while, if the botanical system which he introduced is artificial, Linné himself was perfectly aware of this, and recommended it for mere temporary use till the knowledge of plants should be so far advanced that it could give place to a natural arrangement. See BOTANY.

LINNELL, JOHN, b. London, 1792. In 1805 he was pupil of John Varley, father of the present school of water-color painting. In 1807 he exhibited at the academy "Fishermen, a Scene from Nature." The same year he received a medal at the Royal academy for a drawing from the life, and in 1809 at the British institution, the prize of 50 guineas for the best landscape. He painted many views in Wales and elsewhere, and in 1821 exhibited landscape and portraits. His paintings in earlier years were portraits, but subsequently he devoted himself to landscape and figure painting. His chief works are: "The Morning Walk," "The Windmill," "A Wood Scene," "Eve of the Deluge," "The Return of Ulysses," "Christ and the Woman of Samaria," "The Disobedient Prophet," "The Timber Wagon," "Barley Harvest," "Under the Hawthorn," "Crossing the Brook," "The Last Gleam before the Storm," "Harvest Showers," "A View in Windsor Forest." Among his numerous portraits are "A Family Group—the Artist's Children," those of several fellow-artists, sir Robert Peel, and Thomas Carlyle. Linnell's portraits are in a unique style, deeply studied in character, simple and real, and he ranks among the best landscape-painters.

LINNET, *Linota*, a genus of small birds of the family *fringillidæ*, nearly resembling the true finches, goldfinches, etc. The bill is short, straight, conical, and pointed; the wings long and somewhat pointed; the tail forked. The species are widely distributed in the northern, temperate, and arctic regions, but much confusion has arisen concerning them, from the difference between the plumage of the breeding season and that of the greater part of the year. The COMMON LINNET (*L. cannabina*), or GREATER RED-

POLE (qu. *redpoll*), is common in almost every part of the British islands and of Europe, and extends over Asia to Japan. In size it is about equal to the chaffinch. In its winter plumage its prevailing color is brown, the quill and tail feathers black with white edges; in the nuptial plumage the crown of the head and the breast are bright vermilion color, and a general brightening of color takes place over the rest of the plumage. This change of plumage causes it to be designated the brown, gray, or rose linnet, according to the season of the year and the sex. It is the *lintie* of the Scotch. The sweetness of its song makes it everywhere a favorite. It sings well in a cage, and readily breeds in confinement; but the brightness of the nuptial plumage never appears. The linnet abounds chiefly in somewhat open districts, and seems to prefer uncultivated and furze-covered grounds. Its nest is very often in a furze-bush or hawthorn-hedge; is formed of small twigs and stems of grass, nicely lined with wool or hair; the eggs are four or five in number, pale bluish white, speckled with purple and brown. Linnets congregate in large flocks in winter, and in great part desert the uplands, and resort to the sea-coast.—The MEALY REDPOLE (*L. canescens*) is also a widely distributed species, and is found in North America, as well as in Europe and Asia, chiefly in very northern regions. It is rare in Britain. In size it is nearly equal to the common linnet. By some it is regarded as a larger variety of the LESSER REDPOLE or COMMON REDPOLE (*L. linaria*), which is common in Britain, although in the south of England it is chiefly known as a winter visitant. The forehead, throat, and lore are black; in the spring plumage, the crown of the head is deep crimson; the general color is brown of various shades. The species is common in all the northern parts of the world, enlivening with its pleasant twitter and sprightly habits even the desolate wastes of Spitzbergen.—The only other British species is the MOUNTAIN LINNET, or TWITE (*L. montium*), chiefly found in mountainous or very northern districts. It is smaller than the preceding, has a yellowish bill, and never assumes the red color which marks the nuptial plumage of other species.

LINO'LEUM is, as its name is intended to denote, a peculiar preparation of linseed oil. In 1849 Niclés and Rochelder independently discovered that chloride of sulphur will solidify oil, and render it usable in many new ways. In 1859 M. Perra communicated to the académie des sciences the details of a mode of effecting this by mixing and melting the ingredients, and pouring the mixture out in a thin layer. By varying the proportions the resulting substance assumes varying degrees of consistency. Thus, 100 linseed oil + 25 chloride of sulphur produces a hard and tough substance; 100 oil + 15 chloride, a supple substance like india-rubber; and 100 oil + 5 chloride, a thick pasty mass. This third kind dissolves well in oil of turpentine. Mr. Walton afterwards found that, by the application of heat, linseed oil will become hard without the addition of chloride of sulphur. He conceives that it is not a mere drying, but a real oxidizing. Linseed oil, first boiled, is applied as a layer to a surface of wood or glass, then dried; then another layer; and so on till the required thickness is produced. The sheet is then removed, and is found to be very much like india-rubber in elasticity; in fact, the production of a layer by this means is analogous to the smearing of clay-molds with caoutchouc juice to produce india-rubber, as practiced in South America. See CAOUTCHOUC. The drying is a little expedited by adding a small portion of oxide of lead. The solid oil is crushed, and worked thoroughly between heated rollers; and when treated either with shellac or with naphtha, it becomes applicable in various manufacturing forms. The term *linoleum* properly applies to the hardened or oxidized oil itself, but it is chiefly used as a designation for one of the substances made from or with it, a kind of floor-cloth. When the oxidized oil is rolled into sheets it becomes a substitute for india-rubber or gutta-percha. When dissolved as a varnish or mastic and applied to cloth it is useful for water-proof textiles, felt carpets, carriage-aprons, wagon and cart sheets, nursing-aprons, water-beds, tank-linings, table-covers, etc., according to the mode of treatment. When used as a paint, it is useful for iron, for wood, and for ships' bottoms. When used as a cement it possesses some of the useful properties of marine glue. When vulcanized or rendered quite hard by heat it may be filed, planed, turned, carved, and polished like wood, and used for knife and fork handles, moldings, etc. When brought by certain treatment to the consistency of dough or putty, it may be pressed into embossed molds for ornamental articles. When used as a grinding-wheel, touched with emery, it becomes a good cutter. Lastly, when mixed with ground cork, pressed on canvas by rollers, the canvas coated at the back with a layer of the same oil in the state of paint, and the upper or principal surface painted and printed, it becomes the *linoleum* floor-cloth, for the production of which a factory has been established at Staines. Dunn's patented fabric for similar purposes has no oil in it: it is a mixture of cork-shavings, cotton or wool fibers, and caoutchouc spread upon a cotton or canvas back, and embossed with patterns; it is a kind of kamptulicon (q.v.).

LINSEED, the seed of flax, largely imported from the continent and India, for making *linseed oil* and *oil-cake;* in order to which the seeds are first bruised or crushed, then ground, and afterwards subjected to pressure in a hydraulic or screw press, sometimes without heat, and sometimes with the aid of a steam heat of about 200° Fahr. *Linseed oil* is usually amber-colored, but when perfectly pure it is colorless. It has a peculiar and rather disagreeable odor and taste. It is chiefly used for making varnishes, paints,

etc. That made without heat (*cold-drawn linseed oil*) is purer, and less apt to become rancid, than that in making which heat is applied. By cold expression, the seed yields from 18 to 20 per cent, and with heat from 22 to 27 per cent of oil. Linseed oil, boiled either alone or with litharge, white lead, or white vitriol, dries much more rapidly on exposure to the air than the unboiled oil; and *boiled* or *drying oil* is particularly adapted for many uses.—The oil-cake made in expressing linseed oil is very useful for feeding cattle, and, besides what is made in Britain, it is largely imported from the continent. See OIL-CAKE. Linseed itself is excellent food for cattle and for poultry. The seed coats abound in mucilage, which forms a thick jelly with hot water, and is very useful for fattening cattle.—*Linseed meal*, much used for poultices, is generally made by grinding fresh oil-cake, but it is better if made by grinding the seed itself.

LINSLEY, JOEL HARVEY, D.D., 1790–1868; b. in Cornwall, Vt.; graduated at Middlebury college in 1811, and was tutor there three years; studied law, and practiced in Middlebury until 1822, when he was ordained as a Congregational minister; spent some time in South Carolina as a missionary; was pastor of the South Congregational church in Hartford, Conn., from 1824 to 1832, and of Park street church, Boston, from 1832 to 1835, when he was elected president of Marietta (O.) college, a post which he held for 10 years. In 1847 he became pastor of the Second Congregational church in Greenwich, Conn., and remained there until his death.

LIN'STOCK, an iron-shod wooden staff used in gunnery, for holding the lighted match in readiness to be applied to the touch-hole of the cannon. In old pictures, the linstock is seen planted in the ground to the right rear of each piece, with a match smoking in each of the ends of the fork in which it terminates.

LINT. See FLAX.

LINTEL, the horizontal bearer over doors, windows, and other openings in walls, usually either of stone or wood.

LINTON, ELIZA LYNN, wife of W. J. Linton, b. at Keswick, Cumberland, Eng., 1822. She is the author of a series of papers, *The Girl of the Period*, which attracted wide attention several years ago while they were passing through the *Saturday Review*. She has published several novels, among them *Azeth, the Egyptian; Amymone, a Romance of the Days of Pericles; Realities*, a romance of modern life; *Lizzie Lorton of Greyrigg; Sowing the Wind; The True History of Joshua Davidson; Christian and Communist; Patricia Kemball.*

LINTON, WILLIAM JAMES, b. London, 1812; apprenticed to Mr. G. W. Bonner in 1828; was partner in 1842 of Mr. Orrin Smith, the distinguished wood-engraver, and with him was engaged in the first works published in the *Illustrated London News*. In his younger days he was a zealous chartist, intimate with the Italian, French, and Polish refugees, in whose meetings he took an active part; was deputed by the British workmen to carry to the French provisional government their first congratulatory address; was in 1851 one of the founders of the newspaper, the *Leader;* became in 1855 the editor and manager of *Pen and Pencil;* and for several years was a regular contributor to the *Nation*. He contributed papers to the *Westminster Review, Examiner*, and *Spectator*. As an engraver on wood he holds the first rank. He prepared and illustrated *The History of Wood Engraving; The Works of Deceased British Artists;* several volumes of *The English Republic*. He published also *Claribel and other Poems; Life of Thomas Paine*. In 1867 he came to the United States, resided several years in New York, executed many superior works, and removed to New Haven, where he has a large engraving establishment.

LIN-TSEH-SU, Chinese imperial commissioner, was b. in 1785 at Hing-hwa, in the province of Fuh-keen, and his Chinese biographers have not failed to find that his birth was attended with supernatural indications of future eminence. Till he reached his 17th year, he assisted his father in his trade of making artificial flowers, and spent his evenings in studying to qualify himself for the village competitive examinations, at which he succeeded in obtaining successively the degrees analogous to bachelor of arts and master of arts. His ambitious mind, not satisfied with these triumphs, pointed to Pekin as the fitting sphere of his talents, but poverty barred the way. Happily, however, a wealthy friend, who was filled with admiration for Lin-tseh-su's merits and virtues, invited him to become his son-in-law, and he was now in a position to push his fortune at the capital. He became a doctor of laws and a member of the Hanlin college, which latter honor qualified him for the highest official posts. When 30 years of age, he received his first official appointment as censor; and by displaying the same zeal and industry, combined with irreproachable probity, which he had shown in private life, he gradually rose into the favor of the emperor and his ministers. He was sent to superintend the repairing of the banks of the Yellow river; and on the termination of his mission, two years after, was highly complimented by his sovereign for his diligence and energy, and, as an evidence of imperial favor, was appointed to the post of financial commissioner for Kiang-nan, in which province a famine was at that time decimating the population. Lin-tseh-su exhausted all his private resources and emoluments in providing food for the sufferers, and by careful management succeeded in restoring the prosperity of the province. He was next appointed viceroy of the two provinces of

Shen-se and Kan-su, where, as in Kiang-nan he soon gained the affections of the people and the commendations of the emperor. On his reception by the emperor after his return, new titles were showered upon him, and he obtained the signal honor of entering the imperial precincts on horseback. But now his brilliant progress was to be checked. He had long urged upon his sovereign the adoption of stringent measures towards the importers, dealers, and consumers of opium, the bane and scourge of his native land; and on the commencement of difficulties with Great Britain, he was appointed to deal with the growing evil, and, if possible, put a stop to the obnoxious traffic. He arrived at Canton, invested with unlimited authority; but his unwise though well-meant measures excited a war with Britain, and brought down upon himself the vengeance of his incensed sovereign. He was banished to the region of Ele, where he employed himself in improving the agriculture of the country, by introducing more scientific methods of cultivation. He was soon recalled, and restored to more than his former honors, and did good service by crushing a rebellion in Yun-nan. His health now began to fail, and he obtained permission to retire to his native province; but shortly afterwards, while on his way to attack the Tai-pings, he died, Jan., 1850. His death was the signal for general mourning throughout China, and the emperor ordered a sacrificial prayer to be composed, recording the illustrious deeds of the departed; a signal favor, only conferred upon persons of extraordinary merit and virtue.

Lin-tseh-su, besides thoroughly mastering the statistics and politics of China, devoted much of his time to studying the geography and history of foreign countries, and to private literary study. He is ranked as one of the chief among Chinese poets; and the style, literary merit, and logical order of his public documents form a strange contrast to the usual diffuse, rambling, and incoherent style of Chinese state-papers.

LIN-TSING, a large and populous t. of China in the province of Shantung at the junction of the imperial canal and the Eu-ho river, 200 m. s. of Pekin. It has an octagonal pagoda of nine stories, built of porphyry, granite, and varnished bricks; and several temples, in one of which is a colossal idol of gold. The town has a large trade by the canal.

LINTZ, the capital of the crown-land of upper Austria, is situated in a pleasant district on the right bank of the Danube, which is here crossed by a wooden bridge 838 ft. long, 100 m. w. of Vienna. Pop. '69, 30,538. It is a strongly fortified, quiet town, and a bishop's seat, with numerous churches, benevolent institutions, and government offices. There are large imperial factories for carpets and other woolen goods; and cloths, cottons, cassimeres, fustians, leather, and cards are also made. The navigation of the Danube occasions a lively trade. Steamboats ply daily up the river to Ratisbon, and down the river to Vienna. The women of Lintz are celebrated for their beauty.

LINUM, the genus of plants of which common flax is the most important variety, the others being cultivated not for their fiber, but for ornament. Among these is the perennial flax of the western states, which grows to a height of 18 in., with tufts of slender stems with delicate blue flowers. Other varieties are found in Algiers and Texas.

LI'NUS, a Christian at Rome, known as one of those who sent salutations by Paul to Timothy. Irenæus, in the latter half of the 2d c., says that "Peter and Paul, when they founded and built up the church at Rome, committed the office of its episcopate to Linus." Eusebius in the first half of the 4th c., followed by Theodoret in the 5th, Baronius in the 16th, and Tillemont in the 17th, states that Linus became bishop of Rome after the death of Peter.

LION, *Felis Leo*, the largest and most majestic of the *felidæ* and of carnivorous quadrupeds. It is, when mature, of a nearly uniform tawny or yellowish color, paler on the under-parts; the young alone exhibiting markings like those common in the felidæ; the male has, usually, a great shaggy and flowing mane; and the tail, which is pretty long, terminates in a tuft of hair. The whole frame is extremely muscular, and the fore-parts, in particular, are remarkably powerful; giving, with the large head, bright-flashing eye, and copious mane, a noble appearance to the animal, which, with its strength, has led to its being called the "king of beasts," and to fancies of its noble and generous disposition, having no foundation in reality. A lion of the largest size measures about 8 ft. from the nose to the tail, and the tail about 4 feet. The *lioness* is smaller, has no mane, and is of a lighter color on the under-parts. The strength of the lion is such that he can carry off a heifer as a cat carries a rat.

The lion is chiefly an inhabitant of Africa, although it is found also in some of the wilds of Asia, particularly in certain parts of Arabia, Persia, and India. It was anciently much more common in Asia, and was found in some parts of Europe, particularly in Macedonia and Thrace, according to Herodotus and other authors. It has disappeared also from Egypt, Palestine, and Syria, in which it was once common. The lion is not, in general, an inhabitant of deep forests, but rather of open plains, in which the shelter of occasional bushes or thickets may be found. The breeding-place is always in some much secluded retreat, in which the young—two, three, or four in a litter—are watched

over with great assiduity by both parents, and, if necessary, are defended with great courage—although, in other circumstances, the lion is more disposed to retire from man than to assail him or contend with him. When met in an open country, the lion retires at first slowly, as if ready for battle, but not desirous of it; then more swiftly; and finally by rapid bounds. If compelled to defend himself, the lion manifests great courage. The lion often springs upon his prey by a sudden bound, accompanied with a roar; and it is said that if he fails in seizing it, he does not usually pursue, but retires as if ashamed; it is certain, however, that the lion also often takes his prey by pursuing it, and with great perseverence. The animal singled out for pursuit, as a zebra, may be swifter of foot than the lion, but greater power of endurance enables him to make it his victim. Deer and antelopes are perhaps the most common food of lions. The lion, like the rest of the *felidæ*, is pretty much a nocturnal animal; its eyes are adapted for the night or twilight rather than for the day. It lurks generally in its lair during the day, and issues as night comes on, when its tremendous roar begins to be heard in the wilderness. It has a horror of fires and torch-lights; of which travelers in Africa avail themselves, when surrounded by prowling lions in the wilderness by night, and sleep in safety. Lion-hunting is, of course, attended with danger—a wounded and exasperated lion becoming a most formidable adversary—but besides the necessity of it to farmers in South Africa and other countries where lions abound, it has been found attractive to mere sportsmen from the excitement attending it. The rifle has proved too mighty for the lion wherever it has been employed against him, and lions rapidly disappear before the advance of civilization. In India, they are now confined to a few wild districts; and in South Africa, their nearest haunts are far from Cape Town and from all the long and fully settled regions.

The lion is easily tamed, at least when taken young; and when abundantly supplied with food is very docile, learning to perform feats which excite the admiration of the crowds that visit menageries. Exhibitions of this kind are not, however, unattended with danger, as too many instances have proved. Lions were made to contribute to the barbarous sports of the ancient Romans: a combat of lions was an attractive spectacle; and vast numbers were imported into Rome, chiefly from Africa, for the supply of the amphitheater. Pompey exhibited 600 at once.—Lions have not unfrequently bred in the menageries of Europe, and a hybrid between the lion and the tiger has occasionally been produced.

The mane of the lion, and the tuft at the end of the tail, are not fully developed till he is 6 or 7 years old. The tail terminates in a small prickle, the existence of which was known to the ancients, and which was supposed by them to be a kind of goad to the animal when lashing himself with his tail in rage. The prickle has no connection with the caudal vertebræ, but is merely a little nail or horny cone, about two lines in length, adhering to the skin at the tip of the tail.

There are several varieties of the lion, slightly differing from each other in form and color, but particularly in the development of the mane. The largest lions in the s. of Africa are remarkable for the large size of the head and the great and black mane. The Persian and other Asiatic lions are generally of a lighter color and inferior in size, strength, and ferocity to the African lion. Guzerat and the s. of Persia produce a somewhat smaller variety, remarkable as being almost destitute of mane.

LION, in heraldry. The lion holds an important place among the animals borne in coat-armor. As early as the 12th c., the king of beasts was assumed as an appropriate emblem by the sovereigns of England, Scotland, Norway, Denmark, the native princes of Wales, the counts of Flanders and Holland, and various other European potentates. Lions occur in different positions. 1. The earliest attitude of the heraldic lion is *rampant*, erect on his hind legs, and looking before him, the head being shown in profile, as he appears in the arms of Scotland, and originally did in those of England. This was the normal position of a lion; but as the royal animal came to be used by all who claimed kindred with royalty, and to be granted to favorite followers by way of augmentation, a diversity of attitude was adopted for distinction's sake. 2. *Rampant gardant*, erect on the hind legs, and affronté or full-faced. 3. *Rampant regardant*, erect on the hind legs, and looking backwards. 4. *Passant*, in a walking position, with the head seen in profile. 5. *Passant gardant*, walking, and with the head affronté. 6. *Passant regardant*, walking, and with the head looking behind. 7. *Statant*, with all the four legs on the ground. 8. *Saliant*, in the act of springing forward on his prey. 9. *Sejant*, rising to prepare for action. 10. *Sejant affronté*, as in the crest of Scotland. 11. *Couchant*, lying down, but with his head erect, and his tail beneath him. 12. *Dormant*, asleep, with his head resting on his fore-paws. 13. *Coward* or *coué*, with his tail hanging between his legs. The lion passant gardant is often blazoned as the *lion of England;* and at a time when terms of blazonry were comparatively few it was confounded with the leopard (q.v.), and hence the lion passant and rampant gardant came to be called respectively the *lion-leopardé* and *leopard-lionné*. Two lions may be depicted *rampant combatant*—i.e., face to face—or *rampant addossé*, placed back to back. Among leonine monsters we have two-headed lions, bicorporate and tricorporate lions, lion-dragons, and lion-poissons. There is also the Bohemian lion, with two tails, and the more celebrated winged lion of St. Mark, adopted by the republic of Venice. The island republic bore, azure, a lion winged or

sejant, holding between his fore-paws a book open argent, in which are the words *Pax tibi Marce Evangelista meus.* Two or more lions borne on one shield are sometimes (though never when on a royal coat) blazoned *lioncels.*

LIPANS, a warlike, uncivilized tribe of Indians, found in Texas and parts of Mexico. A few of the tribe were reported to be living in 1872 upon the reservation of the Mescalero Apaches in New Mexico.

LIP'ARI ISLANDS, a group of volcanic islands in the Mediterranean, 12 in number, are situated between lat. 38° 20′ and 38° 55′ n., long. 14° 15′ and 15° 15′ e., on the n. coast of Sicily, and comprised in the department of Messina. The intense volcanic action induced the ancient classical poets to localize in these islands the abode of the fiery god Vulcan—hence their ancient name, *Vulcaniæ Insulæ.* Their collective population is (1871) 12,020, 7,671 of whom are found in the island of Lipari, which, for extent and produce, is much the most important of the group. Lipari is about 18 m. in circuit. Its finest products are grapes, figs, olives, and corn. It has a large export trade in pumice-stone, sulphur, niter, sal-ammoniac, soda, capers, fish, and Malmsey wine, which is largely manufactured both for home and foreign trade. The warm springs of this island are much resorted to. The climate is delightful. Lipari, its chief town, is a bishop's see, possesses two harbors, an episcopal palace, hospital, gymnasium, and a castle built on a fine rock. Pop. '72, 6,047. The island is almost wholly composed of pumice-stone, and supplies all parts of the world with that article. Besides Lipari, the principal islands are Vulcano, Stromboli, Salini, Panaria, Felicudi, Alicudi, and Ustica; Stromboli and Vulcano are actively volcanic.

LI'PETZK, a t. in the s.w. of the government of Tambov, European Russia, on the right bank of the Voronetz, a tributary of the Don, was founded in 1700 by Peter the great, but only began to flourish at the commencement of the present century, when the admirable qualities of its chalybeate springs became known. At present it has a large annual influx of visitors during summer, for whose accommodation a bathing establishment and a splendid garden have been formed. Lipetzk has woolen manufactures. Pop. '67, 14,239.

LIP'OGRAM (Gr. *leipo,* to leave out, and *gramma,* a letter) is a species of verse characterized by the exclusion of a certain letter, either vowel or consonant. The earliest author of lipogrammatic verse was the Greek poet Lasus (b. 538 B.C.); and it is recorded of one Tryphiodorus, a Græco-Egyptian writer of the same period, that he composed an Odyssey in 24 books, from each of which, in succession, one of the letters of the Greek alphabet was excluded. Fabius Claudius Gordianus Fulgentius, a Christian monk of the 6th c., performed a similar feat in Latin. In modern times the Spaniards have been most addicted to this laborious frivolity. Lope de Vega has written five novels, from each of which one of the vowels is excluded; but several French poets have also practiced it. See Henry B. Wheatley's book on *Anagrams* (1862).

LIPPE, or, as it is generally called, LIPPE-DETMOLD, a small principality of northern Germany, surrounded on the w. and s. by Westphalia, and on the e. and n. by Hanover, Brunswick, Waldeck, and a detached portion of Hesse-Cassel. Area, 436 sq.m.; pop. '75, 112,442, nearly the whole of whom belong to the Reformed church and are very well educated. The present constitution of Lippe dates from Mar. 15, 1853; capital, Detmold (q.v.); other towns, Lemgo and Horn. The famous Teutoburg-Wald (*Saltus Teutoburgensis*), in which the legions of Varus were annihilated by Arminius (see GERMANICUS CÆSAR), runs through the southern part of the principality, which is on the whole rather hilly, but has many fertile valleys. The largest river is the Werre, a tributary of the Weser. The principal occupation of the inhabitants is agriculture and the rearing of cattle, sheep, and swine; much pains is likewise bestowed on the cultivation and management of forests, as Lippe is perhaps the most richly wooded district in Germany. Linen-weaving is the chief manufacturing industry of the country. Among the mineral products are marble, iron, lime, and salt. The princes of Lippe are one of the oldest sovereign families of Germany, and were in a flourishing condition as early as the 12th century. The first who took the name of Lippe was Bernhard von der Lippe, in 1129. The family split into three branches in 1613—Lippe, Brake, and Schaumburg.

LIPPE-SCHAUMBURG. See SCHAUMBURG-LIPPE, *ante.*

LIPPI, FRA FILIPPO, a Florentine painter of great talent, the events of whose life were of a very romantic kind. Born about 1412, left an orphan at an early age, he spent his youth as a novice in the convent of the Carmine at Florence, where his talent for art was encouraged and developed. Sailing for pleasure one day, he was seized by corsairs and carried to Barbary; after some years' captivity he regained his liberty, and is next found, in 1438, painting in Florence. Filippo was much employed by Cosmo de' Medici, and executed many important works for him. While painting in the convent of Sta. Margarita at Prato, a young lady, Lucrezia Buti, a boarder or novice, who had been allowed by the nuns to sit for one of the figures in his picture, eloped with him; and though strenuous efforts were made by her relations to recover her, he successfully resisted their attempts, supported, it is thought, by Cosmo; and she remained with and

had a son by him, who became an artist perhaps even more celebrated than Filippo himself. He died at Spoleto, Oct. 8, 1469, being at the time engaged in painting the choir of the cathedral along with Fra Diamante, one of his pupils.

LIPPI, FILIPPINO FILIPPO, commonly called FILIPPINO LIPPI, the son of Fra Filippo and Lucrezia Buti, was b. at Florence in 1460. It is said that his father left him to the care of Fra Diamante, his pupil. He afterwards studied under Sandro Botticelli, also a pupil of his father's, and one of the most celebrated of his school. He soon acquired a high reputation, and executed various works in Florence, Bologna, Genoa, Lucca, and at Rome, where, in 1492, he painted some frescos for the cardinal Caraffa, in the church of Sta. Maria Sopra Minerva. But the high position he attained is proved principally by his works in the Brancacci chapel in the church of the Carmine at Florence. The frescos in this chapel have always been held in the highest estimation; they have been studied by the most celebrated painters, among others by Raphael and Michael Angelo; and though long believed to be entirely the work of Masaccio, are now ascertained to have been commenced by Masolino, continued by Masaccio, and finished by Filippino; the works of the last being—"The Restoring of a Youth to Life," part of which was painted by Masaccio; "The Crucifixion of St. Peter;" "St. Peter and St. Paul before the Proconsul," and "St. Peter liberated from Prison;" also, according to some, "St. Paul visiting St. Peter in Prison," in which the figure of St. Paul was adopted by Raphael in his cartoon of "Paul preaching at Athens." Filippino died at Florence on April 13, 1505.

LIPPINCOTT, SARA JANE (CLARKE), b. at Pompey, N. Y., 1823; educated at Rochester, N. Y., and removed in 1843 to New Brighton, Penn. She began to write at an early age under the *nom de plume* of "Grace Greenwood." In 1853 she was married to Leander K. Lippincott, soon after which she traveled extensively in England and upon the continent. Among her works are *Greenwood Leaves; History of My Pets; Poems; Haps and Mishaps of a Tour in England; Merrie England; Stories from Famous Ballads; Records of Five Years;* and, *Life in New Lands.* She established in 1854 *The Little Pilgrim,* a paper for children, which for several years had a wide circulation. She has appeared extensively upon the platform as a lecturer and dramatic reader, and manifested a deep interest in the movement for the enlargement of woman's opportunities for education and remunerative work. She has also been a correspondent at Washington and other places of a number of the leading journals of the country. It is understood that she is deterred from literary labor at present by ill health.

LIPP'STADT, a t. of Prussian Westphalia, on the left bank of the Lippe, 78 m. n.e. from Cologne. Formerly belonging to Lippe, it became finally Prussian in 1851. It has a very considerable grain trade, and some manufactures of starch, brandy, woolen cloth, etc. Pop. '75, 8,160.

LIPSCOMB, ANDREW A., D.D., LL.D., b. in Georgetown, D. C., Sept. 6, 1816. His father's family removed to Virginia, and, in 1842, he went to Montgomery, Ala., where he won great distinction as a minister of the Methodist Protestant church. In 1860 he became chancellor of the university of Georgia, where he continued until 1874. In 1875 he accepted a professorship in the Vanderbilt university, Nashville, Tenn.

LIPSIUS, JUSTUS, 1547–1606; b. at Isque, near Brussels; educated at Brussels, Louvain, and the Jesuits' college at Cologne. The Jesuits, in view of his talents and learning, endeavored to draw him into their order, but were defeated by his removal, through the influence of his mother, to the university of Louvain. There, to his favorite studies of philology and philosophy, he added jurisprudence. His talent was precocious, and at the age of 19 he published in 1567 his first work, *Variæ Lectiones* of some of the principal Roman authors. This he dedicated to cardinal de Granville, who appointed him his Latin secretary. Accompanying the cardinal to Rome, he remained for two years, associating with learned men, and studying the MSS. in the Vatican and other libraries. In 1577, leaving Italy, he settled at Jena as professor of history and eloquence, and became a Protestant. In 1579 he became professor of history at Leyden, where he was held in high repute. Resigning in 1591 he retired to Spa and afterwards to Mentz, where, in the same year, he returned to the Roman Catholic church, and published two treatises in defense of the worship of saints and of their miraculous powers. While at Spa and Liege he was offered preferments by princes and dignitaries of the church; but he rejected the offers and returned to Louvain, where he was made professor of history and eloquence, remaining there till his death. Of his numerous works the most important are: *De Constantia Manuductia ad Philosophiam Stoicam; Physiologiæ Stoicorum libri tres; De Militia Romana libri quinque.* His commentary on Tacitus was the work in which he chiefly distinguished himself. His works were collected under the title of *Opera Omnia.* At his death he was historiographer to the king of Spain.

LIPSIUS, JUSTUS HERMANN, b. at Leipsic, May 9, 1834; in 1866 became rector of a gymnasium in that city, and has published critical remarks on *Sophocles* and *Lysias.*

LIPSIUS, RICHARD ADELBERT, b. at Gera (Reuss), Germany, Feb. 14, 1830; studied at Leipsic, and became professor of theology there in 1859; in 1861 he was appointed professor of theology at Vienna; in 1865 at Keil. He has published *The Pauline Doctrine of Justification; The First Epistle of Clement of Rome; On Gnosticism; On the Sources of*

the Writings of Epiphanius; The Catalogue of Popes in Eusebius; Chronology of the Bishops of Rome to the Middle of the Fourth Century, and numerous articles in German periodicals.

LIPTO', a co. of n. Hungary, drained by the Wang, an affluent of the Danube; 872 sq.m.; pop. in '70, 79,273, mostly Slavs. The inhabitants are engaged chiefly in agriculture and the raising of cattle; but there are mines of gold, silver, copper, and iron. Capital, Szent-Miklós.

LIQUATION, or ELIQUATION, a method of reducing silver ores by means of a triple alloy of copper, silver, and lead, which, being cast into disk-shaped masses, are placed on edge in a furnace on an inclined plane of iron, containing a small channel, and raised to a red heat; the lead, on melting out, by its attraction for silver, carries that metal with it, leaving the copper as a reddish-black spongy mass.

LIQUEUR. This name is given to any alcoholic preparation which is flavored or perfumed and sweetened to be more agreeable to the taste; there is consequently a large class of liqueurs, of which the following are the principal: *aniseed cordial*, prepared by flavoring weak spirit with aniseed, coriander, and sweet fennel seed, and sweetening with finely clarified syrup of refined sugar. *Absinthe* is sweetened spirit flavored with the young tops of certain species of artemisia (q.v.). *Clove cordial*, much sold in the London gin-shops, is flavored with cloves, bruised, and colored with burned sugar.

Kümmel, or *doppel-kümmel*, is the principal liqueur of Russia; it is made in the ordinary way with sweetened spirit, flavored with cumin and caraway seeds, the latter usually so strong as to conceal any other flavor. It is chiefly made at Riga, and there are two qualities: that made in Riga is the sort in common use, and is not the finest; the better sort is only manufactured in smaller quantities at Weissenstein, in Esthonia; the chief difference is in the greater purity of the spirit used. *Maraschino* is distilled from cherries bruised, but instead of the wild kind, a fine, delicately flavored variety, called *marazques*, grown only in Dalmatia, is used. This cherry is largely cultivated around Zara, the capital, where the liqueur is chiefly made. Great care is taken in the distillation to avoid injury to the delicate flavor, and the finest sugar is used to sweeten it.

Noyau, or *crême de noyau*, is a sweet cordial flavored with bruised bitter-almonds. In Turkey, the fine-flavored kernels of the Mahaleb cherry are used, and in some places the kernels of the peach or the apricot. *Peppermint*, a common liqueur, especially amongst the lower classes of London, where very large quantities are sold; it usually consists of the ordinary sweetened gin, flavored with the essential oil of peppermint, which is previously rubbed up with refined sugar, and formed into an oleosaccharum, which enables it to mix with the very weak spirit.

Curaçoa and *kirschwasser* are described under their own names.

LIQUID, a consonant pronounced by a closure of the vocal organs greater than is required in the utterance of the closer vowels, but less than is demanded by the mute consonants. The liquid consonants are *l, r, w, y*, which are all subject to whispered aspiration.

LIQUIDAM'BAR, a genus of trees of the natural order *altingiaeæ*, and the only genus of the order, having flowers in male and female catkins on the same tree, the fruit formed of two-celled, many-seeded capsules, and the seeds winged. They are tall trees, remarkable for their fragrant balsamic products. *L. styraciflua*, the AMERICAN LIQUIDAMBAR, or SWEET GUM tree, is a beautiful tree with palmate leaves, a native of Mexico and the United States. It grows well in Britain. Its wood is of a hard texture and fine grain, and makes good furniture. From cracks or incisions in the bark, a transparent, yellowish balsamic fluid exudes, called *liquid liquidambar, oil of liquidambar, American storax, copalm balsam*, and sometimes, but erroneously, *white balsam of Peru*. It gradually becomes concrete and darker colored. Its properties are similar to those of storax. That of commerce is mostly brought from Mexico and New Orleans.—*L. orientale*, a smaller tree with palmate leaves, is a native of the Levant and of more eastern regions, and yields abundantly a balsamic fluid, which has been supposed to be the *liquid storax* imported from the Levant, but on this point there is diversity of opinion.

LIQUIDATED DAMAGES. The amount of damages fixed beforehand by the terms of an agreement as the definite sum to be paid by the party to such agreement who violates such agreement. The courts, which construe strictly and will relieve against penalties, will in general support a stipulation for liquidated damages for a breach of contract, but they will hold any particular stipulation to be either a penalty or liquidated damages, according as they determine the intent of the parties as evidenced by the tenor of the whole instrument. If that intent be still ambiguous, the stipulation will be declared a penalty. But if it appear that there is no means to properly find out the damages sustained, the stipulation will be held to be an agreement for liquidated damages, even if it be called a penalty in the agreement itself.

LIQUIDS. See HEAT, HYDROSTATICS, and FUSING AND FREEZING POINTS.

LIRA (Lat. *libra;* see LIVRE), an Italian silver coin of greater or less value, according to time and place. The Tuscan lira was equal to 80 French centimes; the Austrian lira or *zwanziger* was about the same value. The present lira Italiana, or lira nuova, of the Italian kingdom is equal to the French franc, and is divided into 100 centimes.

LI'RIA, a t. of Spain, in the province of Valencia, and 12 m. n.w. from Valencia. The plain in which it stands is luxuriant with vines and olives. On the summit of a hill in the vicinity is the *collegio de San Miguel,* an ancient and venerable monastic pile. Pop. 8,500.

LIRIODEN'DRON. See TULIP TREE.

LISAINE, BATTLE OF, a famous engagement in the Franco-Prussian war, which raged for three days on the small French river Lisaine, which rises at the southern termination of the Vosges, flows w. of the fortress of Belfort, and enters the Savoureuse at Montbéliard. The German gen. von Werder retreated before the French under Bourbaki, and took a position along the Lisaine, in order to prevent the French from attacking the German troops before Belfort, or from making an invasion at that point into Germany. Von Werder, with a force of 43,000 men, well supplied with heavy guns, held a distance of about 10 m. on the left bank of the river, which commands the right bank. The villages along the stream were barricaded. Bourbaki, with 120,000 men, made desperate efforts to drive the Germans from their position, but the latter were so strongly fortified that these efforts were without avail. It was one of the severest engagements of the war. The German loss in killed and wounded was 81 officers and 1847 men; the French loss was 6,000.

LIS'BON (Portug. *Lisboa;* called by the ancient Lusitanians *Olisipo* or *Ulisippo,* and by the Moors *Lishbuna*), the capital of Portugal, is situated in the province of Estremadura, on the right bank of the Tagus, which is here about 6 m. wide, and about 18 m. from the mouth of the river. Pop. 224,063. The city is built partly on the shores of the Tagus, and partly on three larger and four smaller hills. Its appearance is wonderfully picturesque; and its resemblance, in point of situation and magnificence of prospect, to Constantinople, at precisely the opposite extremity of Europe, has been frequently remarked. Including its suburbs, it extends about 5 m. along the river. The harbor, which is safe and spacious, is protected by strong forts, but the city itself is unwalled and without any fortifications. The eastern and older part, which lies around the Castle-hill—an eminence crowned with an old Moorish castle, destroyed by earthquakes—is composed of steep, narrow, crooked, badly-paved streets, with high, gloomy, wretched-looking houses; but the newer portions are well and regularly built. The most beautiful part is called the *New Town*—it stretches along the Tagus, and is crowded with palaces. Among the places or squares, the principal are the *Praço do Commercio,* on the Tagus, 565 ft. long, 520 broad, surrounded on three sides with splendid edifices; the *Praço do Rocio,* in the new town, forming the market-place, 1800 ft. long and 1400 broad; and the *Passeio Publico.* The whole of the new town, and the district round the royal castle, is lighted with gas. Lisbon has 70 parish churches, 200 chapels, numerous monasteries, hospices, and hospitals, 6 theaters, and 2 amphitheaters. The most conspicuous public buildings are the church of the Patriarch, the monastery of the Heart of Jesus (with a cupola of white marble), the church of St. Roque (built of marble), the Foundling hospital (receiving annually about 1600 children), St. James's hospital (capable of receiving 1,600 sick persons), the royal palaces of Ajuda, *Nossa Senhora das Necessidades,* and Bemposta, the custom-houses, the arsenal, and the National theater, on the site of the old inquisition. The city has numerous educational and scientific institutions, and a national library containing 160,000 vols. Among notable objects, the most important is the Alcántara aqueduct, *Os Arcos* or *Aguas livres,* finished in 1743, which supplies all the public fountains and wells of the city. It is 18 m. in length, and in one place 260 ft. high, and remained uninjured at the great earthquake. It is the greatest piece of bridge-architecture in the world. Lisbon has a royal arsenal, ship-building docks, and powder-mills, besides private manufactories of silks, porcelain, paper, and soap; also iron-foundries, and jewelry and trinket establishments. Its chief exports are oranges, citrons, wool, oil, and leather. The shipping accommodation is extensive and commodious, and the trade with Africa is an important and flourishing one. The imports in 1875 were valued at £3,880,295; and the exports at £1,839,507. About 30,000 Galegos (Galicians) earn a subsistence here as porters, water-carriers, and laborers.

Lisbon is said to have been founded by the Phenicians, a ndwas a flourishing city, the capital of Lusitania, when first visited by the Romans. It was taken by the Moors in 712, from whom it was recaptured by Alfonso I. in 1147. It became the seat of an archbishopric in 1390, and of a patriarchate in 1716. Lisbon has been frequently visited by earthquakes; that of 1755 destroyed a great part of the city and 60,000 inhabitants. It was captured by the French in 1807, but given up to the British in 1808, after which it was protected by the lines of Torres Vedras.

LIS'BURN, a market t. and parliamentary borough, situated on the river Lagan, partly in the county of Antrim, partly in the county of Down, Ireland. It is distant from Dublin 97 m. n.n.e., and 8¼ s.s.w. from Belfast, with both which places it is connected by the Dublin and Belfast Junction railway. The pop. in 1871 was 9,326; of whom 4,708 were Protestant Episcopalians, 2,146 Roman Catholics, 1841 Presbyterians, 369 Methodists, and the rest of other denominations. Lisburn originated in the erection of a castle, in 1610, by sir Fulk Conway, to whom the manor was assigned in the settlement of James I.; but its importance dates from the settlement of a number of Hugue-

not families, who, after the revocation of the edict of Nantes, established themselves at Lisburn, where they introduced the manufacture of linen and damask, after the method and with the machinery then in use in the Low Countries. It is a clean and well-ordered town, with a convenient market, and considerable manufactures of linens and damasks; besides which, bleaching, dyeing, flax-dressing, flax-spinning, etc., are carried on. Its parish church is the cathedral of Down and Connor, and is interesting as the burial-place of Jeremy Taylor, who was bishop of that see, and died at Lisburn in 1667. Lisburn returns one member to parliament.

LISIEUX (ancient *Noviomagus Lexovium*), a t. of northern France, in the dep. of Calvados, on the Touques, 27 m. e.s.e. of Caen, at the entrance of a beautiful valley. The principal building is the church of St. Pierre (formerly a cathedral), belonging to the 13th c., and built on the site of an older edifice, in which Henry II. of England married Eleanor of Guienne. Lisieux is the center of an extensive manufacture of coarse linens, woolens, flannels, horsecloths, ribbons, etc., which gives employment to more than 3,000 workmen. Pop. '76, 18,396.

LISKEARD, a municipal and parliamentary borough in Cornwall, is situated in a well-cultivated district, on the Looe, 16 m. w.n.w. of Plymouth. Two miles to the s. of the town is a famous spring, said to have been presented to the inhabitants by St. Keyne, and the virtue of whose waters is set forth in Southey's well-known ballad, *The Well of St. Keyne*. There are manufactures of serge and leather, and considerable traffic in the produce of the tin, copper, and lead mines of the neighborhood. Liskeard returns a member to parliament. Pop. '71, 6,575.

LISLE, GUILLAUME DE, 1675–1726; son of Claud de Lisle, geographer and historian; b. in Paris. At an early age he devoted himself to historical and geographical studies, and when but 9 years old constructed several charts of ancient history. He completely reconstructed the system of geography current in Europe at the beginning of the 18th c. by the publication of maps in which he corrected errors inherited from the time of Ptolemy. He also constructed a celestial and a terrestrial globe. He was admitted to the academy of sciences in 1702, and afterwards appointed tutor in geography to Louis XV., who created for him in 1818 the title of "first geographer to the king," with a pension of 1200 livres. He is said to have drawn no less than 134 maps. A corrected edition of his map of the world appeared in 1724. He contributed several memoirs to the *Collections* of the academy of sciences.

L'ISLET, a s. co. of the province of Quebec, Canada, bounded s.e. by Maine and n.w. by the St. Lawrence; traversed by the Grand Trunk railroad; 793 sq.m.; pop. '71, 13,517, of whom 13,375 were of French descent. Capital, St. Jean Port Joli.

LISMORE, an island of Argyleshire, 6 m. from Oban, is situated in Loch Linnhe, and is 10 m. in length, with an average breadth of 1½ miles. It contains the remains of several interesting buildings, as Achinduin castle—formerly the residence of the bishops of Argyle—an old cathedral, and castle Rachal, a Scandinavian fort, now very ruinous. The island is for the most part under cultivation. Pop. '71, 703.

LIS PENDENS, a pending suit. Pendency of a suit begins, at law, as soon as an attachment is made under the writ; at equity, with the service of the subpœna on the defendant. Every one who takes any step in regard to the property affected by the pending suit is presumed at equity to have notice of such suit, and his rights will be correspondingly affected; thus, a purchaser of such property, though never made party to the suit, takes subject to the decree made in it; and a suit pending, brought by a prior mortagee whose mortgage has never been put on record, is held sufficient notice to a following mortagee of the existence of the prior mortgage. Though these applications of *lis pendens* occur only in courts of equity, the legal doctrine, that a vendee holds by the same title as his vendor, and no better, amounts to much the same thing.

LISSA, anciently *Issa*, an island in the Adriatic, off the Dalmatian coast, and belonging to Dalmatia; 10 m. long, 5 broad; 43° 10′ n. lat., 33° 51′ e. long.; 38 sq.m.; pop. 7,000. It was long known to the ancients, and is mentioned by Scylax as a Greek colony. In Cæsar's time it was styled *nobilissimum earum regionum oppidum*, and Pliny says the inhabitants were Roman citizens. It is often referred to by Polybius in his account of the Illyrian war. When besieged by Teuta, the siege was raised on the appearance of the Roman fleet, and the inhabitants placed themselves under the protection of Rome. It was afterwards a station for the Roman galleys in their wars with the kings of Macedon. Its shores are steep and rocky, and it is accessible only at a few bays. The soil is not fertile. The chief products are wine, oil, almonds, and anchovies. The island is noted in modern times for two victories, that gained by the British over the French in 1811, and that by the Austrians under gen. Tegethoff over the Italians under admiral Persano. Its two harbors are strongly fortified. Lissa or San Giorgio is the principal town and seaport on the n.e. shore, with a population of 2,800.

LISSA (Pol. *Leszna*), a t. of Prussia, in the province of Posen, and the circle of Fraustadt, 44 m. s.s.w. of Posen. Pop. '75, 11,069, of whom nearly one half are Jews. Lissa has a fine town-house, a castle, one Roman Catholic and three Protestant churches, with manufactures of woolens, leather, and tobacco. This place became for a time the chief seat of the Bohemian brothers.

LIST. See FILLET.

LIST, FRIEDRICH, 1789–1846; b. Reutlingen in Würtemberg; was for two or three years professor of political economy at the university of Tübingen; was elected member of the diet of Würtemberg, but was expelled in 1822 for his censure of the acts of the government, and condemned to ten months' imprisonment. He fled to Switzerland and Alsace, but returning in 1824 was imprisoned in the fortress of Asperg. Having received a pardon he emigrated to America and settled in Pennsylvania. In 1827 he published his *Outlines of a New System of Political Economy*, which attracted much attention. He became a large land-holder, and in connection with others settled the two towns of Port Clinton and Tamaqua in Schuylkill county. On the latter he discovered a valuable deposit of anthracite. At this time he was much interested in the establishment of railroads. In 1830 he was appointed U. S. consul at Hamburg, but soon came back to Pennsylvania, and in 1832 returned to Europe, acting for a while in 1833 as American consul at Leipsic. In 1837 he went to Paris, where he wrote several letters for the Augsburg *Allgemeine Zeitung*, which were afterwards published in a volume under the title of *Das Nationale System der Politischen Oekonomie*. In 1843 he established at Augsburg the *Zollvereinsblatt*, in which he advocated a national commercial system and a national fleet. He visited Austria and Hungary in 1844, and England in 1846 for the purpose of forming a commercial alliance between Germany and that country, in which his efforts were not successful. Depressed by the failure of his plans, the loss of his health and property, he shot himself in a fit of insanity. His works, with a biography, were published in 3 volumes in 1850 at Stuttgart.

LISTON, JOHN, 1776–1846; b. London; educated at Dr. Barrow's school; became second master of St. Martin's school, founded by archbishop Tenison. For acting in theatrical plays with the large boys he was expelled from the school, and went upon the stage, excelling in low comedy. He acted at the Haymarket theater in 1806, and afterwards at Covent Garden, Drury Lane, and the Olympic. He was greatly praised by Lamb, Hood, and others. He left the stage in 1837, having acquired a considerable fortune.

LISTON, ROBERT, a celebrated surgeon, was b. at Ecclesmachan, in the county of Linlithgow, in 1794, and was the son of the rev. Henry Liston, the minister of the parish. After studying anatomy under Barclay in Edinburgh, and following the usual course of medical study in that city, he proceeded to London in 1816, where he attended the surgical practice of the Blizards at the London hospital, and of Abernethy at St. Bartholomew's. After becoming a member of the royal college of surgeons of London, he returned to Edinburgh, and in 1818 was elected a fellow of the royal college of surgeons of that city.

Liston now commenced his career as a lecturer on anatomy and surgery, and soon became remarkable for his boldness and skill as an operator. In consequence of his performing many successful operations on patients who had been discharged as incurable by the surgeons of the Edinburgh infirmary, he was requested by the managers to refuse his assistance to any person who had been a patient in that institution, and to abstain from visiting the wards. He naturally declined to accede to these extraordinary propositions, and in consequence was expelled, and never entered again its wards, until in 1827 he was elected one of its surgeons. His surgical skill, and the rapidity with which his operations were performed, soon acquired for him a European reputation; and in 1835 he accepted the invitation of the council of University college to fill the chair of clinical surgery. He soon acquired a large London practice; in 1840 he was elected a member of the council of the college of surgeons; and in 1846 he became one of the board of examiners. In the very climax of his fame, and apparently in the enjoyment of vigorous health, he was struck down by disease, and died Dec. 7, 1847.

His most important works are his *Elements of Surgery*, which appeared in 1831, and his *Practical Surgery*, which appeared in 1837, and has gone through four editions. His uncontrollable temper, and the coarseness of language in which he frequently indulged, involved him in various quarrels with his professional brethren; yet, notwithstanding these defects, he always succeeded in obtaining the regard and esteem of his pupils.

LISZT, FRANZ, pianist, was b. at Raiding, in Hungary, Oct. 22, 1811. His father, a functionary employed on the estates of prince Esterhazy, was himself possessed of some musical skill, and carefully cultivated the wonderful talent which Liszt showed even in his infancy. In his ninth year, the child played publicly at Presburg, and excited universal astonishment. By the assistance of two Hungarian noblemen—counts Amadi and Sapary—Liszt was sent to Vienna, and placed under the instruction of Czerny and Salieri. He studied assiduously for eighteen months, after which he gave concerts in Vienna, Munich, and other places, with brilliant success. In 1823 he proceeded with his father to France, intending to complete his musical education at the conservatoire; but he was refused admission on account of his being a foreigner; nevertheless, his genius made a way for itself. He played before the duke of Orleans, and very soon the clever, daring boy became the favorite of all Paris. Artists, scholars, high personages, ladies—all paid homage to his marvelous gift, and it was only owing to his father's

strict supervision that young Liszt was not entirely spoiled. In the course of the next three years, he visited England thrice, and was warmly received. In 1827 his father died at Boulogne, and Liszt became his own master at the age of sixteen. For some years after this, his life sufficiently proved that he had become independent too soon. Alternations of dissipation and religious mysticism induced his admirers to fear that his artistic course would end in disastrous failure. Fortunately, he heard the famous violinist, Paganini, in 1831, and was seized with a sudden ambition to become the Paganini of the piano; and one may say that on the whole he has succeeded. Up till 1847 his career was a perpetual series of triumphs in all the capitals of Europe. He then grew tired of his itinerant life, and became leader of the court concerts and operas at Weimar. In 1865 he took sacred orders and became a monk, in the chapel of the Vatican, Rome; and in 1871 returned to his native country, which granted him a pension of £600 a year. In 1875 he was named director of the Hungarian academy of music. Liszt has also been an industrious and original contributor to musical literature.

LITANY (Gr. *litaneia*, a supplication), a word the specific meaning of which has varied considerably at different times, but which means in general a solemn act of supplication addressed with the object of averting the divine anger, and especially on occasions of public calamity. Through all the varieties of form which litanies have assumed, one characteristic has always been maintained—viz., that the prayer alternates between the priest or other minister, who announces the object of each petition, and the congregation, who reply in a common supplicatory form, the most usual of which was the well-known "Kyrie eleison!" (Lord, have mercy!) In one procession which Mabillon describes, this prayer, alternating with "Christe eleison," was repeated 300 times; and in the capitularies of Charlemagne, it is ordered that the "Kyrie eleison" shall be sung by the men, the women answering "Christe eleison." From the 4th c. downwards, the use of litanies was general. The *Antiphonary* of St. Gregory the great contains several. In the Roman Catholic church three litanies are especially in use—the "litany of the saints" (which is the most ancient), the "litany of the name of Jesus," and the "litany of Our Lady of Loretto." Of these, the first alone has a place in the public service-books of the church, on the rogation-days, in the ordination service, the service for the consecration of churches, the consecration of cemeteries, and many other offices. Although called by the name of litany of the saints, the opening and closing petitions, and indeed the greater part of the litany, consist of prayers addressed directly to God; and the prayers to the saints are not for their help, but for their intercession on behalf of the worshipers. The litany of Jesus consists of a number of addresses to our Lord under his various relations to men, in connection with the several details of his passion, and of adjurations of him through the memory of what he has done and suffered for the salvation of mankind. The date of this form of prayer is uncertain, but it is referred, with much probability, to the time of St. Bernardino of Siena, in the 15th century. The litany of Loretto (see LORETTO) resembles both the above-named litanies in its opening addresses to the holy Trinity, and in its closing petitions to the "Lamb of God, who taketh away the sins of the world;" but the main body of the petitions are addressed to the Virgin Mary under various titles, some taken from the Scriptures, some from the language of the fathers, some from the mystic writers of the mediæval church. Neither this litany nor that of Jesus has ever formed part of any of the ritual or liturgical offices of the Catholic church, but there can be no doubt that both have in various ways received the sanction of the highest authorities of the Roman church.

In the prayer-book of the English church the litany is retained, but although it partakes of ancient forms, it differs from that of the Roman church, and contains no invocation of the Virgin or the saints. It is divided into four parts—invocations, deprecations, intercessions, and supplications, in which are preserved the old form of alternate prayer and response. It is no longer a distinct service, but, when used, forms part of the morning prayer.

LITCH'FIELD, a co. of Connecticut, forming its n.w. corner, and bounded n. by Massachusetts and w. by the state of New York; intersected by the Housatonic, Farmington, and Naugatuck rivers, and by the Housatonic, Naugatuck, and Connecticut Western railroads; about 900 sq.m.; pop. in '80, 52,043, of whom 44,609 were of American birth. The surface is hilly, and extensively covered with forests. The soil is for the most part fertile; hay, butter, cheese, tobacco, cattle, oats, and corn being the staple productions. The quantity of hay and butter produced in this county in 1870 exceeded that of the same articles in any other county of the state. The production of staples in 1870 was: 6,822 bush. of wheat, 50,444 of rye, 236,900 of corn, 257,606 of oats, 27,561 of buckwheat, 319,497 of potatoes, 1,048,569 lbs. of tobacco, 51,759 of wool, 1,617,850 of butter, 1,307,396 of cheese, and 109,415 tons of hay. There were in the county at the same time 6,076 horses, 22,514 milch cows, 6,482 working oxen, 17,477 other cattle, 17,824 sheep, and 7,232 swine. Water-power is abundant, and there is in the county a great variety of manufactures, including such articles as agricultural implements, brass and brass-ware, pins, carriages, cotton goods, cutlery and edge-tools, hardware, hats and caps, iron and machinery, needles, paper, plated ware, silk goods, tin, copper and sheet-iron ware, woolen and worsted goods, leather, flour, and lumber. Capital, Litchfield.

LITCHFIELD, a t., the county seat of Litchfield co., in n.w. Connecticut; pop. '80, 3'410. About 1800 ft. above the level of the sea, it is noted for the invigorating purity of its summer climate, and has become a favorite resort of summer boarders from New York. It is on high ground, between the Naugatuck and Shepaug rivers, near a beautiful lake, the largest in the state. The noble elms of the old streets and picturesque surrounding scenery have long made it celebrated. In 1784 a law school was established here by judge Tapping Reene, and conducted by judge James Gould from 1823 to 1838, which was at the time the most celebrated in the United States. Many of the most eminent jurists and statesmen of the country graduated there. The first ladies' seminary in the United States was established in Litchfield. The town had social refinement and culture; and Dr. Lyman Beecher gave celebrity to its pulpit (Congregational). Water-power from its lake has made it the seat of many manufacturing industries, including mills, for making paper, oil, satinets, and smelters for reducing and refining nickel ores found in the vicinity. The town is subdivided into five postal districts, viz.: Litchfield, Bantam Falls, East Litchfield, Milton, and Northfield. It has a private lunatic asylum, and the usual quota of public schools, churches, newspapers, and business houses.

LITCHFIELD, a city of Montgomery co., Ill., on the Indianapolis and St. Louis railroad, where it crosses the Wabash railroad, 45 m. s. of Springfield, and 50 m. n.e. of St. Louis. It is situated on a fine rolling prairie, and is the most populous town in the county. It has 7 churches, an Ursuline convent and academy, a high school, a Roman Catholic hospital, 2 newspapers, 2 banks, 2 steam flouring mills, workshops of the Indianapolis and St. Louis railroad, and several grain elevators. Pop. about 5,000.

LITCHI, or LEE-CHEE, *Nephelium Litchi*, one of the most delicious fruits of China and of the Malayan archipelago. The tree which produces it belongs to the natural order *lapindaceæ*, and has pinnate leaves. It is extensively cultivated in the southern provinces of China, and in the northern provinces of Cochin-China, but is said to be impatient of a climate either much more hot or much more cold. The fruit is of the size of a small walnut, and grows in racemes. It is a red or green berry, with a thin, tough, leathery, scaly rind, and a colorless semi-transparent pulp, in the center of which is one large dark-brown seed. The pulp is slightly sweet, subacid, and very grateful. The Chinese preserve the fruit by drying, and in the dried state it is now frequently imported into Britain, still preserving much richness of flavor.—The *longan* and *rambutan* are fruits of the same genus.

LITER, the unit of the present French measures of capacity, both dry and liquid. It is the volume of a cubic decimeter (see METER), and is equal to 0.2200967 British imperial gallon. It is subdivided decimally into the *deciliter*, *centiliter*, and *milliliter* (respectively $\frac{1}{10}$th, $\frac{1}{100}$th, and $\frac{1}{1000}$th of a liter). Ten liters are a *decaliter;* 100, a *hectoliter;* 1000, a *kiloliter*. The hectoliter is the common measure for grain, and is equal to 0.3439009 British imperial quarter, or nearly $2\frac{3}{4}$ imperial bushels.

LITER. See METRIC SYSTEM.

LITERARY PROPERTY (aside from copyright, trade-mark, and patent), the ownership by an author of his writings, apart from any connection with their publication or promulgation. In this sense the title is in the material and form of its subject, and not in any quality predicated on its market value; as, for instance, the abstract property which the author has in his unpublished play, and which, in this sense, is neither more nor less than that which inheres in the authorship of a letter. But it is to be observed that this property is not mere ownership; as in the case of an article which is a gift, a purchase, or a bequest. The title rests on the fact of creation, and is more akin to the interest which a father has in the productive capacity or earning faculty of his children than to anything else. To illustrate the specific distinction which characterizes this species of property, it may be observed that the author who inscribes and presents a written copy of verses to his friend does not, by these acts, part with this peculiar title. The recipient may give away the copy of verses, that being his; but if, by any chance, incident, or collusion, those verses are made public, the one to whom they were given becomes liable to prosecution therefor. The law holds this property to be transferable, by bequest, or by regular order of succession, or absolute gift, clearly stated. It cannot be seized by creditors for publication, and its unauthorized publication will be restrained in equity. Literary property is held at common law, but in the United States the copyright act recognizes the right of property in any manuscript whatever, including private letters.

LITERATURE, AMERICAN. See AMERICAN LITERATURE.

LITHARGE. See LEAD.

LITHGOW, WILLIAM, 1583–1614; b. Scotland; a traveler, who began by traveling on foot through central Europe, Italy, Greece, Turkey, Egypt, and Palestine, and presented a collection of relics to James I. and the queen on his return to England. His next tour was through the states of northern Africa, and through Hungary and Poland on his return. On his third journey he bore letters from king James commending him to all the royal heads of the countries which he might visit. At Malaga he was arrested on suspicion of being a spy, and subjected to shameful tortures. His *Adventures* were published in 1614.

LITHIA. See LITHIUM.

LITHIC ACID. See URIC ACID.

LITHIC ACID DIATH'ESIS is the term employed in medicine to designate the condition in which there is an excess of lithic (or uric) acid, either free or in combination, or both, in the urine. The urine of persons who have the lithic acid diathesis is usually of a dark golden color, like brown sherry, and is more acid, of higher specific gravity, and less abundant than the urine in health. When the urine cools, there is usually a deposit or sediment of lithates. The sediment is usually spoken of as one of lithate (or urate) of ammonia, but in reality it consists mainly of lithate of soda mixed with lithates of ammonia, potash, and lime. Its color varies according to the amount and nature of the urine-pigment which tenaciously adheres to it, so that its tints vary from a whitish yellow to a brick-dust red, or even a deep purple. Persons seeing these deposits in their urine when it has cooled are very apt to believe that they may aggregate and harden in the bladder, and form a stone. Such fears may, however, be relieved by heating the urine containing the sediment to the temperature of the interior of the body (about 100°), when the fluid will resume its original clearness, and the sediment will disappear.

The color of the deposit is of considerable importance in determining its value as a morbid symptom. Tawny or reddish sediments of this kind are frequently the result of mere indigestion or a common cold; the yellowish-white ones deserve more attention, as they are believed frequently to precede the excretion of sugar through the kidneys. The pink or brick-dust sediments are almost always associated with febrile disturbance or acute rheumatism; and if these sediments are habitual, without fever, there is most probably disease of the liver or spleen. If the urine is very acid, a portion of the lithic acid is separated from its base, and shows itself, as the fluid cools, in a free crystallized state, resembling, to the naked eye, grains of cayenne pepper, but appearing under the microscope as rhombic tablets. This free lithic acid is far less common than the lithates, and does not dissolve on the application of heat.

The persons who suffer from this diathesis are chiefly adults beyond the middle age, and of indolent and luxurious or intemperate habits. As the formation of lithic deposits is due to over-acidity of the urine, alkalies are the medicines most commonly prescribed, and the preparations of potash are far preferable to those of soda, because lithate of potash is perfectly soluble, and will pass off dissolved in the urine, while lithate of soda is a hard, insoluble salt.

Regimen is, however, of far more use than medicine in the lithic acid diathesis. The patient should dine moderately and very plainly, avoiding acid, saccharine, and starchy matters and fermented liquors. The skin should be made to act freely by friction, and by occasional warm or daily tepid baths. Warm clothing must be used; plenty of active exercise must be taken in the open air; and the healthy action of the bowels and liver duly attended to. It must be recollected that the lithates are sometimes thrown down, not from undue acidity of the urine, but simply from that fluid not containing the due quantity of water to hold them in solution. In such cases a tumbler of cold spring-water taken night and morning will at once cause the cessation of this morbid symptom.

LITH'IUM (symb. Li; equiv. 7.0; sp. gr. 0.5936) is the metallic base of the alkali *lithia*, and derives its name from the Greek word *lithos*, a stone. The metal is of a white silvery appearance and is much harder than sodium or potassium, but softer than lead. It admits of being welded at ordinary temperatures, and of being drawn out into wire, which, however, is inferior in tenacity to leaden wire. It fuses at 356°. It is the lightest of all known metals, its specific gravity being little more than half that of water; it decomposes water at ordinary temperatures. It burns with a brilliant light in oxygen, chlorine, and the vapors of iodine and bromine. It is easily reduced from its chloride by means of a galvanic battery. Lithium forms two compounds with oxygen, viz., lithia (known also as lithion or lithon), which is the oxide of lithium, and a peroxide of lithium whose formula has not been determined.

Lithia, in a pure and isolated state, cannot be obtained. Hydrate of lithia (LO,HO) occurs as a white translucent mass, which closely resembles the hydrates of potash and soda. The salts of lithia are of sparing occurrence in nature. The minerals petalite, triphane, lepidolite, and tourmaline contain lithia in combination with silicic acid, while triphyline and amblygonite contain it as a phosphate; it is also present in small quantities in many mineral waters.

Carbonate of lithia (LO,CO_2) is precipitated when carbonate of ammonia is added to a strong solution of chloride of lithium, and occurs as a white mass with a slight alkaline reaction. At a dull red heat, it melts into a white enamel. It requires 100 parts of water for its solution, but is more soluble in water charged with carbonic acid. The solution of the salt has been strongly recommended in cases of gout and gravel, in consequence of the solvent power which it exerts on uric acid. The sulphate, phosphate, and nitrate of lithia are of no special importance. Chloride of lithium (LCl+4 aq.) is readily prepared by dissolving the hydrate of lithia in hydrochloric acid, and evaporating. It crystallizes in octohedra, and is one of the most deliquescent salts known. It is of importance as being the source from whence lithium and carbonate of lithia are obtained.

Lithia was discovered in 1817 by Arfvedson. The metal lithium was first obtained in 1822 by Brande, but nothing was known regarding its properties until 1855, when Bunsen and Matthiessen discovered the present method of obtaining it, and carefully investigated its physical and chemical characters.

LITHOD'OMUS, a genus of stone-boring mollusks belonging to the family of mussels, the type of which is the *Mytilus lithophagus* of Linnæus.

LITHOG'RAPHY (Gr. *lithos*, a stone), the art of printing from stone, was invented by Aloys Senefelder, at Munich, about the end of the 18th century. It consists, first, in writing and drawing on the stone with the pen and brush, with the graver, and with the crayon or chalk; or in transferring to the stone writings and drawings made with the pen or brush on transfer-paper, or impressions from copper, steel, and pewter plates, taken on a coated paper, and then in printing off from the stone the writings or drawings thus made upon it. The principles of the art are these: an unctuous composition having been made to adhere to a calcareo-argillaceous stone, those parts covered by it—i.e., the writing or drawing—acquire the power of receiving printing-ink, whereas those parts not containing the writing or drawing are prevented from receiving ink from the inking-roller by the interposition of water; and lastly, an absorbent paper being laid on the stone, and subjected to strong pressure, copies are obtained.

The best *lithographic stones* are found at Kelheim and Solenhofen, near Pappenheim, on the Danube, in Bavaria; but they have been found also in Silesia, England, France, Canada, and the West Indies. These stones are composed of lime, clay, and siliceous earth, and are of various hues, from a pale yellowish-white to a light buff, reddish, pearl-gray, light-gray, blue, and greenish color. Those of uniform color are the best. The yellow-buff ones, being soft, are adapted for lettering and transfer; the pearl-gray ones, being harder, for chalk-drawings and engraving. They are found in beds, commencing with layers of the thickness of paper, till they reach the dimensions of one and several inches in thickness, when they are easily cut, being yet soft in the quarries, to the sizes required for printing purposes. The stones are ground plane with sand, and, when required for the pen, the brush, the graver, or transfer, they are polished with pumice and water-of-Ayr stone; and for chalk-drawings and graduated tints, an artificial grain is given by ground glass or fine sand.

When any writing or drawing has been finished on stone, it then requires to be etched, thus: a mixture of 2 parts of nitric acid, and from 40 to 60 parts of dissolved gum-arabic, is poured over the stone once or several times, according to the nature of the work. The etching changes the surface of the stone, raising the work on it to a degree scarcely perceptible to the naked eye. The writing or drawing, which has been effected by greasy ink or chalk, remains protected from the action of the acid, and those protected parts retain the natural property of the stone, which is the qualification of receiving printing-ink; and, when the printer wets the stone before applying the inking-roller, the water enters only those parts of the stone which have been affected by the acid, while the ink adheres only to those parts, however fine, on which the acid could not operate, owing to the unctuous composition of the ink or chalk with which the drawing or writing has been done, and which, being greasy, rejects the water. Thus it is called *chemical printing*.

The *chemical ink*, for *writings and drawings in line*, is composed of 2 parts of white wax, 2 shellac, 1 hard soap, ½ tallow, ½ carbonate of soda, and 1 of powdered lamp, or better, Paris black. The chemical chalk (crayon) is made of 3 parts of white wax, 2 hard soap, 1 shellac, ½ "drops of" mastic, 1 tallow, ½ old lard, ½ Venetian turpentine, ½ Brunswick black, ½ carbonate of soda, and 1½ of Paris black, properly melted and burned together.

When the *drawing* or *writing with ink* on a polished stone is completed, the etching is proceeded with, and a portion of the etching composition allowed to dry on the stone. The printer then adjusts his stone in the press, washes off the dried gum, removes the whole drawing or writing with turpentine, wets the stone with a sponge or damping canvas, then applies his roller containing the printing-ink, and rolls it several times over the stone till the lines appear again. When sufficient ink has been applied to the lines, the paper is laid on the stone, drawn through the press, and the impression effected. The damping and inking of the stone are renewed for every impression.

Chalk-drawings are done on the grained stone with the chemical chalk with the stump and scraper, and sharp lines with ink; so that, if boldly and systematically treated, by giving the effect first, and detail afterwards, there will be produced richness and softness of appearance and freedom of manipulation, and a great many impressions will be yielded.

Tinted drawings, *chromo-lithography*, and *colored maps* require as many stones—grained or polished, as the case may be—as there are various tints or colors, one stone being printed after the other, and so fitted and blended together as to produce when complete, the effect desired.

Great Britain is famed for *writings, plans, and drawings*, done with transparent quills, steel-pens, and small camel-hair brushes, *on yellow transfer-paper*, prepared as follows: 1 part best flake-white, 1 isinglass or gelatine, with a little gamboge to give it color, are dissolved in water over a slow fire, then sifted through double muslin and spread *once*,

in a very warm state, with a large, flat camel-hair brush on *one* side of good-sized, smooth, thin paper, which, when dry, requires to be passed frequently, over a heated stone, through the press. The paper being drawn or written upon with lithographic ink is, when finished, put for a few minutes between damp blotting-paper; a warmed stone is put in the press, the sheet is placed with the coated side upon it, and then passed several times through the press; the back of the paper, now adhering to the stone, is then sponged with water; the stone is turned and passed several times again through the press in the opposite direction, after which the sheet is softened with water, and rubbed with the fingers until it can be easily removed from the stone. Some gum is then put upon it, and a linen rag dipped in printing-ink, and with the aid of a little water, passed in all directions over the lines till they appear black and clean. The stone is then allowed to cool, inked up with the roller, then very slightly etched, and after being cleaned is ready for use.

Authography is the name given to a writing or drawing done with the chemical ink on one side of any plain—*not coated*—paper; for example, bankers' circulars: the transfer is done in the same manner as already described, with the difference that the sheet, when laid on the stone, is passed only *once* through the press.

Transferring of any writings, maps, drawings in line or music, done on copper, steel, and pewter-plates, and *retransferring* of any line-work *already on the stone*, form an important part of lithography, as an unlimited number of impressions can be produced *at a very moderate expense without wearing out* the original plates or stones, and as parts of various plates, stones, and letterpress can be transferred to, and printed from, *the same stone*. The best *transfer-paper for this purpose* is the following: mix 3 parts of shoemakers' paste (without alum) with 1 part of best ground plaster of Paris, a little dissolved patent glue, and some tepid water; strain the mixture through double muslin in a common jar, and, when cooled, spread it with a large, flat camel-hair brush over half-sized thickish paper. The *ink* for *taking transfers* is a composition of two table-spoonfuls of printing varnish, 1½ parts of tallow, 3 brown hard soap, 4 brown wax, 5 shellac, 5 black pitch, and 2½ parts of powered lampblack. The various ingredients are melted for 25 minutes, and set fire to the mass for other 15 minutes; afterwards formed in sticks. When the impressions have been made on this coated paper with this transfer-ink, the transfer is accomplished on the stone as already described.

With regard to *engraving* and *etching on stone, photo-lithography*, the *application* of *electrotyping* to *lithography*, the working of the *ruling-machine* for skies and ornaments, the *lithographic steam-press*, etc., we must refer the reader to special works on lithography; and see under PHOTOGRAPHY.

It may not be out of place to mention that in the field of lithography Germany occupies the first place for *careful execution*, France for *rich* and *artistic effect*, Britain for *transferring, tint-printing*, and *chromo-printing*.

Strixner, Hohe, Hanfstängl, Piloty, Loehle, Locillot, Auer, Leon Noel, Mouilleron, Engelmann, Sabatier, Calame, Lasalle, Haghe, Ghémar, Hullmandel, Day, Hanhart, Brooks, Lemercier, may be mentioned, from among many others, who have helped to perfect lithography.

LITHOL'OGY (*lithos*, a stone) is that division of geology which considers the constitution and structure of rocks, apart from their relations in time or position to each other. See GEOLOGY.

LITH'OMARGE, an earthy mineral, sometimes called *mountain marrow* (Ger. *Steinmark*), consisting chiefly of silica and alumina, with oxide of iron and various coloring substances. It is soft, greasy to the touch, and adheres strongly to the tongue. It is generally white, yellow, or red, often exhibiting very beautiful colors. It is found in Germany, Russia, etc., also in the tin-mines of Redruth in Cornwall.

LITHONTRIP'TICS (from the Greek words *lithos*, a stone, and *tribo*, I wear out) is the term which is applied to those remedies which, whether taken by the mouth or injected into the bladder, act as solvents for the stone.

Various medicines have at different times been recommended and employed as solvents for the stone. Rather more than a century ago, limewater and soap, when swallowed in sufficient quantities, had a high reputation as solvents for urinary calculi. These were the only active ingredients in Miss Stephens's *Receipt for the Stone and Gravel*, which was reported on so favorably by a committee of professional men that parliament, in 1739, purchased the secret for £5,000. The treatment doubtless afforded relief; but there is no evidence that any calculus was actually dissolved, for in the bladder of each of the four persons whose cure was certified in the report the stone was found after death. At present no substance which, taken by the mouth, has the power of dissolving calculi is known; but as Dr. Prout remarks in his well-known treatise, *On the Nature and Treatment of Stomach and Urinary Diseases*, remedies of this class are to be sought "among harmless and unirritating compounds the elements of which are so associated as to act at the same time, with respect to calculous ingredients, both as alkalies and acids." Solutions of the supercarbonated alkalies containing a great excess of carbonic acid—as, for example, the natural mineral waters of Vichy—approach most nearly to what is required. The relief which, in many instances, has followed the administration

by the mouth of substances supposed to be lithontriptics has been derived not from the solution of the calculi, but from the diminution of pain and irritation in the bladder.

On the other hand, considerable success has been obtained by the direct injection of solvents into the bladder, especially when the nature of the calculus is suspected; weak alkaline solutions have apparently caused the disappearance of uric-acid calculi, while phosphatic calculi have unquestionably been dissolved by the injection of very weak acid solutions. It is reported that a weak galvanic current has been recently found successful in the hands of an Italian surgeon.

LITHOPHA'GIDÆ (Gr. stone-eaters), a term sometimes applied to the mollusks which bore holes for their own residence in rocks. See PHOLAS.

LITH'OPHANE (Gr. *phanos*, clear, transparent), a peculiar style of ornamental porcelain chiefly adapted to lamps and other transparencies; it consists of pretty pictures produced on thin sheets of white porcelain by stamping the porcelain, whilst still soft, with raised plaster-of-Paris casts of the pictures intended to be produced. By this means an intaglio impression is obtained; and when the sheet of porcelain has been hardened by fire, the impression gives a picture, owing to the transparency of the porcelain, which has the lights and shadows correctly shown, if viewed by transmitted light. Lithophane pictures are common in Germany, where the art has been more favorably received than in France, its native country. They are usually employed to form the sides of ornamental lamps and lanterns, and are sometimes inserted in decorative windows.

LITHOT'OMY (Gr. *lithos*, a stone; *tŏmē*, the act of cutting), the technical name for the surgical operation popularly called *cutting for the stone*.

As most of the symptoms of stone in the bladder (which are noticed in the article CALCULUS) may be simulated by other diseases of the bladder and adjacent parts, it is necessary to have additional evidence regarding the true nature of the case before resorting to so serious an operation as lithotomy. This evidence is afforded by *sounding* the patient—a simple preliminary operation, which consists in introducing into the bladder, through the natural urinary passage (the urethra), a metallic instrument, by means of which the stone can be plainly felt and heard.

Lithotomy has been performed in various ways at different times. The earliest form of lithotomy is known as *cutting on the gripe*, or *Celsus's method*. It received the former name from the stone, after being fixed by the pressure of the fingers in the anus, being directly cut upon and extracted; and the latter, from its having been first described, so far as is now known, by Celsus, although it had probably been practiced from time immemorial. At a later period this operation received from Marianus the name of the *apparatus minor* (from a knife and hook being the only instruments used), to distinguish it from his own method, which he called the *apparatus major*, from the numerous instruments he employed. The *Marian method* was founded on the erroneous idea that wounds of membranous parts would not heal, while their dilatation was comparatively harmless. The object was to do as little as possible with the knife, and as much as possible with dilating instruments; and the necessary result was laceration and such other severe injury, that this became one of the most fatal operations in surgery. Nevertheless, it was the operation mainly in vogue for nearly 200 years, till Frère Jaques, in 1697, introduced what is essentially the method now in use.

The *lateral operation*, so called from the lateral direction in which the incision is made into the neck of the bladder, in order to avoid wounding the rectum, is that which, with various minor modifications, is almost universally employed at the present day. Frère Jaques, a priest, seems to have learned the method from a provincial surgeon named Pierre France, and to have practiced it with much success, and in 1697 he came to Paris in order to make it publicly known. The advantage of this operation, by which a free opening, sufficiently large for the extraction of a stone, can be made into the bladder without laceration of the parts or injury to the rectum, was immediately recognized by the leading surgeons of the time, and the Marian process was at once universally given up.

We can only very briefly indicate the leading steps of the operation. The patient being laid on the table, and chloroform being administered, an instrument termed a curved staff, with a deep groove, is passed into the bladder. An incision is then made on the left side of the mesial line, about an inch and three-quarters in front of the anus, and extending downwards to midway between the anus and the tuberosity of the left ischium. The incision should be sufficiently deep for the operator, on introducing a finger of the left hand, to feel the groove of the staff. The knife, directed by this finger, is now fixed in the groove, and sliding along it towards the bladder, divides the membranous portion of the urethra, the edge of the prostate, and the neck of the bladder. The knife is now withdrawn, as also is the staff, and the surgeon introduces the forceps over the finger of the left hand into the bladder, feels for the stone, and draws it out.

It is unnecessary to enter into any of the details of the after-treatment. At first the urine escapes through the wound, but in favorable cases it is voided by the natural passage in a week, and the wound heals in the course of a month.

From the shortness of the female urethra and the extent to which it can be dilated,

and, additionally, from the comparative rarity of calculous affections in women, the operation of lithotomy is exclusively restricted to the male sex.

The danger of the operation seems to vary with the age of the patient. Out of 186 cases collected by Mr. Hutchinson of the London hospital, 137 were under the age of 20, and of these, 123, or nearly 90 per cent, recovered; while of the 49 who were over 20 years of age, 26, or more than 53 per cent, died.

LITHOT'RITY (Gr. stone-crushing), the surgical operation of breaking up a stone in the bladder into such small fragments that they may readily be expelled by the urethra. Although the importance of such an operation has been recognized from the earliest time, a French surgeon, Civiale, who commenced his researches in 1817, but did not perform his first operation till the beginning of 1824, is entitled to be regarded as the discoverer of lithotrity. The instrument by which the disintegration of the stone is effected is introduced in the same manner as a catheter or sound into the bladder, and, after catching the stone, either bores, hammers, or crushes it to pieces.

Crushing is now generally preferred, the stone being grasped by the blades of the instrument, one blade acting on the other by means of a screw.

The process seems, at first sight, so safe, as compared with the operation of lithotomy, that it is necessary to distinguish those cases in which it may be resorted to and those in which it is contra-indicated. It may be resorted to when the patient is an adult, and the urethra full-sized and healthy, so as freely to admit the passage of the instrument; when the prostate is not much enlarged, which is very often the case in old men, and when the bladder is not thickened or very irritable: while it must be avoided in children, in consequence of the smallness of the urethra; when there is great irritation and thickening of the bladder; when there is great enlargement of the prostate, which hinders the manipulation of the instrument and the escape of the broken fragments of stone; when the stone is of large size, as, for example, of a greater diameter than 2 in.; and when there is reason to believe that the concretion is a mulberry calculus, which, from its extreme hardness, cannot readily be broken. Great care must be taken that no fragment remains in the bladder, as such fragments are almost sure to form the nuclei of fresh calculi.

LITHUA'NIA, a former grand-duchy, holding of the crown of Poland, which, before the partitions of that country, was composed of three groups of territory: 1. Lithuania proper, or Litiva, which formed the governments of Wilna and Troki; 2. The duchy of Samogitia; 3. Russian Lithuania, comprising Polesie, Black Russia or Novogrodek, White Russia or Minsk, Meislav, Witebsk, Smolensk, Polotsk, and Polish Livonia. This country contained about 135,000 English sq.m., and was partitioned between Russia and Prussia, the latter receiving what is now denominated the government of Gumbinnen, in e. Prussia. The Lithuanians, a race to whom belong the Letts of Livonia, the Cours of Courland, and the ancient inhabitants of e. Prussia, are probably a Slavonic people, whose original characteristics have been much modified by time and the intermixture of other races. According to Latham, the Lithuanian language approaches nearer to the Sanskrit than any other member of the Aryan group.

Lithuania was at first subject to Russia, but shook off the yoke about the end of the 12th c. and became an independent power. Their rulers, who bore the title of grand-duke, conquered the neighboring Russian provinces, and even carried their ravages to the very gates of Moscow. The grand-duke of Lithuania, Jagellon, was in 1386 elected king of Poland, and issued an edict of union between the two countries, and in 1569 the two were declared to be one country.

LITIZ, a borough of Lancaster co., Penn., on the Reading and Columbia railroad, 20 m. s.w. of Reading. It has 3 churches; Linden hall, a well-known Moravian school for girls; a bank; a newspaper; and manufactures of beer, flour, coaches, machinery, cigars, etc. The town is an ancient settlement of the Moravians, who are still the chief element in its population and social life.

LITMUS is a well-known coloring matter which is obtained from several lichens, but chiefly from *lecanora tartarea*. The lichens are powdered and digested with ammoniacal fluids (urine, for example) till they undergo decomposition. Alum, potash, and lime are then added, and the mixture is allowed to stand till the maximum degree of color is observed. Sand and chalk are added, to give a due degree of solidity, and the mass is then dried in cubes, and is ready for the market. The exact nature of the changes which ensue is not altogether known; it is, however, certain that the pigment is originally red, and that it only becomes blue on the addition of alkalies or of lime. This blue color is again changed into a red on the addition of a free acid.

The use of litmus-paper and tincture of litmus for the purpose of detecting the acidity of fluids, etc., is known to every student of chemistry. See TEST-PAPERS.

LITTA, POMPEO, Count; 1781–1852; b. Italy; in early life an officer in the French army, and participant in the battles of Ulm, Austerlitz, and Wagram. In the revolutionary epoch of 1848 in Italy he was for a short time secretary of war of the provisional government. His fame, however, rests on the authorship of a superb work on the celebrated families of Italy—*Famiglie celebri d'Italia*—which is commended equally for the fullness and accuracy of its biographies, the beauty of its typography, and the ele-

gance of its style. Its first publication was by subscription in 1819. At the time of his death it embraced the history of 113 families. Others have been added since by Oderici and Passerini.

LITTELL, ELIAKIM; 1797–1870; b. Burlington, N. J.; in 1819 began to publish and edit at Philadelphia the *National Recorder*, afterwards the *Saturday Magazine*. In 1822 he established the *Museum of Foreign Literature*, and in 1844 founded *Littell's Living Age* in Boston, a periodical which is still continued, and greatly valued for its judicious selections from the current periodical literature of Europe. He drew up the Clay compromise tariff of 1833. Died in Brookline, Mass.

LITTLE, GEORGE; 1754–1809; b. Marshfield, Mass.; was commander of the armed vessel, *The Boston*, belonging to Massachusetts at the beginning of the revolutionary war; was first lieut. on *The Protector* in 1779, when it was captured by a British frigate, and he was taken to England as a prisoner; having made his escape, he subsequently took command of the sloop *Winthrop* and cruised successfully till the end of the war; commanded the national frigate *Boston* in 1798; was made capt. of the navy in 1799; retired to his farm in Weymouth in 1801, and lived there until his death. He wrote *The American Cruiser* and *Life on the Ocean*.

LITTLE CHRISTIANS, a new sect formed in 1868 by members of the Russo-Greek church living at Atkarsk in the province of Saratoff, Russia. There were at first but 16 members. They claim that Christ commanded them to form the new church. Before doing it they were immersed, and fasted, and changed their names. They condemned worship of saints and altar-pieces as idolatrous, and abandoned the use of bread and wine in the Lord's supper. Dixon in his *Free Russia* says: "They have no priests, and hardly any form of prayer. They keep no images, use no wafers and make no sacred oil. Instead of the consecrated bread, they bake a cake, which they afterwards worship, as a special gift from God. This cake is like a penny bun in shape and size, but in the minds of these *Little Christians* it possesses a potent virtue and a mystic charm." They gave themselves the name they bear. They have been persecuted by the government, but have increased in numbers.

LITTLEDALE, RICHARD FREDERICK, b. Dublin, 1833; graduated in Trinity college, Dublin, 1854; was ordained in the church of England, 1856; and after a few years of parochial service in London, devoted himself to authorship on ecclesiastical questions, making a special study of liturgies and of the relations between the national church and dissenting bodies. He is author of *Philosophy of Revivals; Offices of the Holy Eastern Church; Catholic Ritual in the Church of England;* and many other works.

LITTLE FALLS, a village of New York, on the Mohawk river, 91 m. n.w. of Albany, on the line of the Erie canal, and New York Central railroad. The Mohawk here passes through a romantic defile of 2 m. in length, with falls of 42 ft., giving water-power to several paper-mills, woolen factories, flouring-mills, etc. The village has numerous churches, a bank, newspapers, and manufactures of starch, shoes, etc. Pop. in '70, 5,387.

LITTLE FALLS (*ante*), a t. and village of Herkimer co., N. Y., on the Mohawk river, the Erie canal, and the New York Central railroad, 73 m. w.n.w. of Albany. Pop. of the town, '80, 6,911. The river here passes through a narrow gorge, and has a fall of more than 40 ft. in three-fourths of a mile, affording abundant water-power. The Erie canal passes by a deep cut 2 m. long in solid rock, presenting a most picturesque appearance, and the feeder crosses the river by an aqueduct with an arch of 70 ft. span. Many of the dwellings in the village stand upon steep declivities, commanding views of attractive scenery. The place contains 8 churches, a bank, 2 newspapers, an academy, and manufactories of cotton, paper, starch, axes, woolens, boots and shoes, etc. It is also the center of a considerable trade in cheese.

LITTLE HUMBOLDT RIVER, in Humboldt co., Nev.; a tributary of the Humboldt river from the n.w., flowing from an elevation of 4,500 ft., through the fertile Paradise valley, where large areas of excellent bench-land and bottom-land are subject to easy irrigation from it. It is about 250 m. by sea n. from San Francisco.

LITTLEJOHN, ABRAM NEWKIRK, D.D., LL.D., b. N. Y., 1824; graduated at Union college in 1845; ordained deacon in the Protestant Episcopal church in 1848; admitted to priest's orders in 1849; was rector of Christ church, Springfield, Mass., in 1850, of St. Paul's church in New Haven 1851–60, and of the Holy Trinity church in Brooklyn 1860–69. He declined the offer of the presidency of Hobart college in 1858, and the appointment as bishop of central New York in 1868. In 1868 Long Island was made a separate diocese, and Dr. Littlejohn was elected its bishop and consecrated in 1869. He was appointed by the presiding bishop in 1874 to take charge of the American Episcopal church in Europe. His contributions to periodicals, especially the *Church Review*, have been numerous. In 1854 he delivered a course of lectures on the *Philosophy of Religion* in Philadelphia. He has published also sermons, charges, and addresses. His diocesan administration has shown high executive ability.

LITTLE KANAWHA RIVER, of western Virginia; a tributary of the Ohio river, emptying at Parkersburg, and having its source in Upshur county. It is in the coal-oil

district, and for the transportation of oil and other commodities, slack-water navigation has been created up the river 38 m. to Burning Springs by means of three dams and locks. It flows through a hilly country well suited to sheep growing, and is bordered by rich bottom-lands. Logs for lumber were formerly the principal product of its region.

LITTLE RIVER, a co. of s.w. Arkansas, bordering upon Texas and the Indian territory, and lying between Little and Red rivers; 500 sq.m.; pop. '80, 6,404, of whom 3,342 are colored. It has a diversified surface and a fertile soil. Cotton, corn, and pork are staple products. Valuation of real and personal property, $1,289,241. Capital, Richmond.

LITTLE ROCK, the capital of Arkansas, is situated on the s. bank of the Arkansas river, 300 m. from its mouth, on the first bed of rocks bounding the alluvial valley of the Mississippi. It contains the state capitol, an arsenal, penitentiary, and the usual number of churches. Founded in 1820. Pop. in '70, 12,380.

LITTLE ROCK (*ante*), capital and chief city of Arkansas; pop. '80, 13,185; so named in antithesis to Big Rock, an elevation on the opposite side of the Arkansas river, nearly 500 ft. in height; that on which the city stands being not more than 40 or 50 ft. above the shore. It is handsomely laid out, with broad streets; the business blocks of brick, and the residences surrounded by ornamental gardens and shade-trees; reached by the Little Rock and Fort Scott, the Memphis and Little Rock, and the St. Louis, Iron Mountain and Southern railroads. The state-house and St. John's college are prominent public buildings; and there are a U. S. arsenal and land-office, state penitentiary, and state institutions for deaf mutes and for the blind. Steamers on the Arkansas river touch at Little Rock, and it is a considerable commercial center. The city is considered remarkably healthful.

LITTLE SISTERS OF THE POOR, a Roman Catholic sisterhood originated by M. Le Pailleur at St. Servan, France, in 1840. Their function is to care for the poor and old. They have several houses in the United States.

LITTLETON, an agricultural and manufacturing t. of Grafton co., N. H., on Ammonoosuc river and the Boston, Concord and Montreal railroad. As it is but 28 m. from Mt. Washington, it is also a summer resort. It is well supplied with hotels, banks, churches, and schools; and has a newspaper, a woolen mill, and several factories, the making of stereoscopic views being a specialty. Pop. 2,446.

LITTLETON, ADAM, D.D., 1627–94; b. at Hales-Owen, Shropshire, Eng.; educated at Christ church, Oxford, where he took a high rank in the classics; was successively rector of Chelsea, chaplain to king Charles II., and in 1674 prebendary of Westminster. He was a distinguished oriental scholar, and made a collection of rare books and manuscripts so large that it brought him to bankruptcy. He wrote much on recondite subjects, and published a number of sermons; but his principal work was the *Dictionary of the Latin, Greek, Hebrew, and English Languages*, of which several editions were published. He was a descendant of sir Thomas Littleton. Died at Chelsea.

LITTLETON, or **LYTTLETON**, Sir THOMAS, a celebrated English jurist, was b. early in the 15th c. (the exact year is not known), studied—it is thought probable—at Cambridge, after which he removed to the inner temple. Henry VI. appointed him steward or judge of the court of the palace, and in 1455 king's sergeant, in which capacity he traveled the northern circuit. In 1466 he was made one of the judges of the court of common pleas; and in 1475 he was created knight of the bath. He died Aug. 23, 1481. Littleton's fame rests on his work on *Tenures*, which was originally written in Norman-French, and first published about the time of his death. It went through a multitude of editions. The first translation into English was made in 1539, and in the course of the next 100 years it went through no loss than 24 editions. The changes in the laws relative to property have greatly diminished its value, and it is now little studied by lawyers; yet it is considered a model from the clear and logical manner in which the subject is handled.

LITTLE TURTLE, d. 1812; an Indian chief of the Miami nation, distinguished for his intelligence, shrewdness, and courage; date of birth unknown. He commanded in the battles which resulted in the defeat of gen. Harmar on the Miami in 1790, and of gen. St. Clair at St. Mary's in 1791; was present, though not in command, at the battle of Maumee Rapids in 1794, when the Indians were defeated by gen. Wayne; was one of the signers of the treaty of Greenville in 1795, which closed the war and secured to the whites large tracts of land in Ohio. In 1797 he visited pres. Washington in Philadelphia, on which occasion he had an interview with Volney, the French philosopher, and received from Kosiusco a pair of pistols, elegantly mounted. Died at Fort Wayne.

LITTLE VALLEY, a t. in Cattaraugus co., N. Y.; pop. '70, 1108; situated on the Erie railroad, and near the Alleghany river. The leading business interest is farming and dairying, though there are also steam mills, stores, and a generally active condition of affairs.

LITTORA'LE, or LITORALE, a province of the Austro-Hungarian monarchy, situated on the n. shores of the Adriatic sea, and including the neighboring islands. It comprises the counties of Görz and Gradisca, the margraviate of Istria, and the district

of Trieste; 3,085 sq.m.; pop. 600,525. In former times the name was applied to two strips of land on the n. shores of the Adriatic, the eastern one of which has figured in Hungarian history. It was once a part of the Croatian military territory, was made a civil district of Hungary by Maria Theresa, formed a part of the French province of Illyria under Napoleon, was recovered by Austria in 1814, reannexed to Hungary in 1823, occupied by Croatia in 1848, and attached to that province by Francis Joseph in 1849. The principal towns of the province are Buccari and Porto Re.

LITTRÉ, MAXIMILIEN PAUL EMILE, a French journalist and philologist, member of the academy, was b. in Paris, Feb. 1, 1801. He distinguished himself in his studies, and obtained various honors at the grand competition. He began the study of medicine, and pursued it so far with distinction; he did not, however, take the degree of doctor, nor enter on practice, but gave himself up to researches in philology, mastering the principal ancient and modern languages, and in the history of medicine. At the same time that Littré took an active part in editing various journals and literary collections, he prepared an edition and translation of the works of Hippocrates (*Œuvres d'Hippocrate*, 1839–61, 10 vols. 8vo), a publication which immediately opened for him the doors of the academy of inscriptions (Feb., 1839).

Littré, who held democratic opinions, and had distinguished himself among the combatants of July, became afterwards connected with the *National*, and was one of the principal editors of it till 1851. When M. Auguste Comte's new philosophical and social doctrine appeared under the name of positive philosophy, Littré, attracted by the scientific character of the doctrine, took it up with great ardor, and in 1845 wrote a lucid and clever summary of it (*De la Philosophie Positive*), and afterwards defended it in pamphlets and in journal articles. He looked upon the revolution of 1848 as the advent of his opinions; but soon undeceived, he retired from active politics in Oct., 1848, resigning even his office of municipal councilor of the city of Paris. He had ere this declined the decoration of the legion of honor. Returning to a life of study Littré continued his researches in medicine, at the same time working ardently at the history of the French language. Already master of the old forms of the French language, he published in the *Revue des Deux Mondes*—to which he has contributed at different times several papers equally ingenious and learned—an article called, The Homeric Poetry and the Ancient French Poetry (*La Poésie Homerique et l'Ancienne Poésie Française*, July 1, 1847), which attracted great attention. In it he attempted the translation of the first book of the *Iliad* in the style of the Trouvères. The academy of inscriptions chose him, in place of Fauriel (1844), to be one of the commission charged with continuing *L'Histoire Littéraire de France* (The Literary History of France), and he is one of the authors of vols. xxi., xxii., xxiii. In 1854 he was appointed editor of the *Journal des Savants*, and he has since contributed many articles to that collection. Littré's principal work is his *Dictionnaire de la Langue Française*, containing, in addition to the usual information in French dictionaries, examples of the several meanings of the words, with exact reference to the classical works from which they are taken, besides the history of the usage of each word in documents anterior to the 17th century. Not only are all questions of grammar and lexicography (including etymology—a subject in which French dictionaries have hitherto been singularly deficient) fully discussed, but historical allusions are explained, and numerous details given regarding the arts and sciences, rendering the work a kind of cyclopædia. In preparation for many years, it began to appear in 1863, and was completed in 1873. This splendid work, which is the real *thesaurus* of the French language, so long a desideratum, did not prevent the French academy in 1863 from rejecting the author, whom M. Dupanloup denounced publicly as holding immoral and impious doctrines. Littré has also published an excellent French translation of Strauss's *Life of Jesus* (1839–40, 2d ed. 1855); and a translation of Pliny's *Natural History*. In 1832 he published a paper on cholera. As editor or *collaborateur*, Littré was connected with the *Dictionnaire de Médecine*, the *Gazette Medicale de Paris*, and the surgical journal called *L'Expérience*. We may also notice from his pen—*Histoire de la Langue Française* (1862, 2 vols. 8vo); *Paroles de Philosophie Positive* (1859); *Auguste Comte et la Philosophie Positive* (1863); and *Auguste Comte et Stuart Mill* (1866). He published in 1857 the *Œuvres Complètes d'Armand Carrel*. In 1870 he contributed to the *Revue Positiviste* an article *Des Origines organiques de la Morale*, which attracted great notice, and furnished with new argument the Catholic theologians, who accused him of atheism. Three months before, Littré had opposed the publication of M. Comte's later works as being unworthy of him. Just before the siege of Paris, Littré's friends compelled him to quit the capital. In Jan., 1871, M. Gambetta appointed Littré professor of history and geography at the ecole polytechnique. Next month he was chosen representative of the Seine department in the national assembly, where he sat with the party of the left. At its sitting of Dec. 30, 1871, the French academy at last admitted him to membership, choosing him to fill the place of M. Villemain. On this occasion, M. Dupanloup, bishop of Orleans, thought fit to resign his connection with the academy. In 1875 he was made a doctor of literature by Leyden university, and member of the Austrian academy. *Médecine et Médecins* was published by Littré in 1872.

LIT'TROW, JOSEPH JOHANN VON, 1781–1840; b. Bohemia. First a professor of astronomy at Cracow; afterwards at the university of Kazan, in the city of the same

name, 430 m. e. of Moscow. In the later years of his life he became professor of astronomy in the university of Vienna, and director of the observatory, in the management of which he became eminent. His lectures were extremely popular. His published works are: *Die Wunder des Himmels*, which has passed through several editions; *Theoretische und practische Astronomie;* and *Atlas des gestimten Himmels.* Died in Vienna.

LIT'URGY (Gr. *leitourgia*, a public service), in general, signifies a form of prayer and ceremonial established by ecclesiastical authority, to be used in the public services of the church, but is especially applied to that used in the celebration and administration of the eucharist. The very earliest historical records of Christianity plainly show that such forms were in use in the primitive times, but it seems highly probable that for a considerable period they were not reduced to writing; and hence even those of the extant liturgies which represent the earliest forms differ considerably from each other, if not in the substance of the rite, at least in the arrangement even of those parts which are common to them all. A theological discussion of the subject of the liturgy, though, of course, most important in a doctrinal point of view, and most interesting for the study of Christian antiquities, would be out of place in a popular cyclopædia. The liturgies form the great stronghold of the Catholic controversialists on the subject of the real presence and of the eucharistic sacrifice; but we must confine ourselves to a brief historical account of the various liturgies now extant, and of their connection with the various ancient Christian communities, whether of the east or of the west. Liturgies may, indeed, best be distributed into two classes, those of the east, and those of the west.

1. *Oriental Liturgies.*—The oriental liturgies are six in number, four of which are derived from the great churches in which they were used; the fifth from the Armenian church, which early formed a distinct liturgy; and the sixth from the great Syrian sect of Nestorius, by which the liturgy was modified to suit its own peculiar tenets. These liturgies are severally known as the liturgies of Jerusalem, of Antioch, of Alexandria, and of Constantinople, the Armenian liturgy, and the Nestorian liturgy. The diversities of these liturgies, although very great in appearance, yet can hardly be said to be substantial. Certain leading parts are common to them all, and are found in all without substantial variation; but they are arranged in a different order, and, except in the form of the eucharistic consecration, the hymn Trisagion, and a few other details, the form of words is often entirely dissimilar. The liturgy of Jerusalem, although ascribed to St. James, is of uncertain origin and date; nor is it well ascertained whether its original language was Syriac or Greek. The latter is the language in which it is now found, and the present liturgy closely corresponds in the main with that which formed the text of St. Cyril of Jerusalem in his well-known mystagogical lectures. The liturgy of Antioch exists in Syriac, but it is evidently only a free translation of the liturgy of Jerusalem. The ancient liturgy of Alexandria is ascribed to St. Mark; but the existing liturgy has received numberless additions at later dates, and has been modified by both the great sects of this patriarchate to suit their peculiar doctrines. Several other liturgies are in use among the Copts, under the name of St. Basil, St. Gregory, and St. Cyril; and the Abyssinian Christians have no fewer than ten, which are distinct, at least in name. The church of Constantinople has two different liturgies, both of great antiquity, that of St. Basil and that of St. Chrysostom. These, however, are not indiscriminately used, each being employed on special occasions or on certain defined festivals. The liturgy of Constantinople is the original of the Slavonic liturgy, which is used in the Russian and Russo-Greek church, and in its various branches. The Armenian liturgy dates from the introduction of Christianity into Armenia under Gregory the illuminator. It is in most respects derived from that of St. Chrysostom. The Nestorians have three liturgies—the liturgy of the apostles, the liturgy of Theodore of Mopsuestia, and the liturgy of Nestorius. These, however, are all combined into one, each being assigned to a particular season, or used on special occasions. The language of all is Syriac.

2. *Western Liturgies.*—The liturgies of the west present much less variety, and indeed are all derived either from the eastern liturgies or from a common source. The Catholic liturgies may be reduced to four—the Roman, the Milanese or Ambrosian, the Gothic or Mozarabic, and the Gallic liturgies. The oldest forms of the Roman liturgy are to be found in three so-called sacramentaries—that of Leo, that of Gelasius, and that of Gregory the great. It is the last that has left its impress most clearly on the modern Roman missal, which was brought to its present shape by a commission ordered by the council of Trent, after a careful revision and collation of all the liturgical forms in use in the west in the 16th century. The first revision took place under Pius V., and two subsequent revisions were made by Urban VIII. and Clement VIII. The Ambrosian liturgy is used only in the diocese of Milan, and is popularly traced to St. Ambrose. It bears a close analogy to the Roman liturgy, but it has many peculiarities, some of which are highly interesting, as illustrating the history of the details of Christian worship. Its ceremonial, which is observed with great solemnity in the cathedral of Milan, is in some parts highly striking and characteristic. The Gothic or Mozarabic is of still more limited use, being now confined to a single chapel at Toledo, founded and endowed for the purpose by the celebrated cardinal Ximenes. It is the old liturgy of the Gothic

church of Spain; and after the infusion of the Arabic element, which followed the Moorish invasion, it was called by the name of Mozarabic, a word of disputed etymology. This liturgy is certainly of oriental origin; but its history, and the time and circumstances of its introduction into Spain, have furnished matter for much speculation. Some parts of the rite are exceedingly curious, especially those which accompany the breaking of the host. The Gallican liturgy has no precise modern representative, and is only known from ancient forms, more or less complete, which have been edited by Mabillon, and recently by Mone. The older Gallican forms bespeak an oriental origin, and are probably derived from the Greek Christian colony which settled at Marseilles, Lyons, and the other churches of the south. The later forms approximate more to the Roman. Neither of these, however, is to be confounded with the more modern missals in use in several of the French dioceses, which do not differ from the Roman except in minor details, and most of which have now been displaced by the Roman missal. Of Protestant communities, the Anglican church alone professes to follow the ancient liturgical forms (see COMMON PRAYER, BOOK OF). See Renaudot's *Orientalium Liturgiarum Collectio*, 1740, 2 vols.; Assemanni's *Bibliotheca Orientalis;* Palmer's *Antiquities of the English Liturgy;* Binterim's *Denkwürdigkeiten der Christ-Katholischen Kirche.*

LITURGY, JEWISH, in the narrower sense of a ritual of fixed prayers, chiefly for public worship. The Mosaic records contain an ordinance respecting the "confession of sins" (Lev. v. 5; xvi. 21), without, however, prescribing a distinct form for the purpose. Three formulas only are fixed—the benediction of the priests (Num. vi. 24–26), the prayer of thanksgiving on the occasion of the first offering (Deut. xxvi. 5–10), and that which was to accompany the offering up of the third year's tithe, beginning: "I have brought away the hallowed things out of my house" (ib. 13–15). Although prayers are often mentioned before the exile, yet they do not seem, except in the cases mentioned, to have been introduced as yet as a regular element into the service of the temple. The songs of the Levites (1 Chr. xvi. 4; xxiii. 3), and occasional prayers, such as are to be found in the Psalms, or like that of Solomon at the inauguration of the temple, are all we find recorded. Private devotions were common (cf. 1 Kings, viii. 30, etc.; Is. i. 15), but every one prayed when his heart prompted him in the words inspired by his joy or sorrow. Not before the time of Daniel is a fixed institution of three daily prayers mentioned (Dan. vi. 11). The task of compiling a liturgy proper, and of fixing the times and seasons of prayer, was probably first undertaken by the men of the great synagogue. Two chief groups around which, as time wore on, an enormous mass of liturgical poetry has clustered, are distinctly discernible—the one, the *Shemah* ("Hear, Israel," etc.), being a collection of the three biblical pieces (Deut. vi. 4–9; xi. 13–21; Num. xv. 37–41), expressive of the unity of God and the memory of his government over Israel, strung together without any extraneous addition; the second, the *Tefillah*, or prayer, by way of eminence (adopted into Islam as *Salavat*, Sur. ii. 40; cf. v. 15), consisting of a certain number of supplications with a hymnal introduction and conclusion, and followed by the priestly blessing. The single portions of this prayer gradually increased to 18, and the prayer itself received the name *Shemonah Esre* (eighteen). The first additions to the *Shemah* formed the introductory thanksgiving for the renewed day, in accordance with the ordinance that every supplication must be preceded by a prayer of thanks, called *Jozer* (Creator of light, etc), to which were joined *the three holies* (*Ofan*), and the supplication for spiritual enlightening in the divine law (*Ahaba*). Between the Shemah and the Tefillah was inserted the *Geulah* (liberation), or praise for the miraculous deliverance from Egypt and the constant watchings of Providence. A *Kaddish* (sanctification), and certain psalms, seem to have concluded the service of that period. This was the order of the *Shaharith*, or morning prayer; and very similar to this was the *Maarib*, or evening prayer; while in the *Minha*, or afternoon prayer, the Shemah was omitted. On new moons, Sabbath and feast days, the general order was the same as on week days; but since the festive joy was to overrule all individual sorrow and supplication, the intermediate portion of the Tefillah was changed according to the special significance and the memories of the day of the solemnity, and additional prayers were introduced for these extraordinary occasions, corresponding to the additional sacrifice in the temple, and varying according to the special solemnity of the day (*Mussaf, Nëilah*, etc.). The first compilation of a liturgy is recorded of Amram Gaon (870–80 A.D.); the first that has survived is that of Saadja Gaon (d. 942 A.D.). These early collections of prayers generally contained also compositions from the hand of the compiler, and minor additions, such as ethical tracts, almanacs, etc., and were called *Siddurim* (orders, rituals), embracing the whole calendar year, week-days and new moons, fasts and festivals. Later, the term was restricted to the week-day ritual, that for the festivals being called *Machsor* (cycle). Besides these, we find the *Selichoth*, or penitential prayers; *Kinoth*, or elegies; *Hoshanahs*, or hosannahs (for the seventh day of the feast of tabernacles); and *Bakashoth*, or special supplications, chiefly for private devotion.

The public prayers were for a long time only said by the public reader (*Chasan, Sheliach Zibbur*), the people joining in silent responses and amens. These readers by degrees—chiefly from the 10th c.—introduced occasional prayers (*Piutim*) of their own,

over and above those used of yore. The materials were taken from Halacha (q.v.) as well as from Haggada (q.v.); religious doctrine, history, saga, angelology, and mysticism, interspersed with biblical verses, are thus found put together like a mosaic of the most original and fantastic, often grand and brilliant, and often obscure and feeble kind; and the pure Hebrew in many cases made room for a corrupt Chaldee. We can only point out here the two chief groups of religious poetry—viz., the Arabic on the one, and the French-German school on the other hand. The most eminent representative of the Pajtanic age (ending c. 1100) is Eleazer Biribi Kalir. Among the most celebrated poets in his manner are Meshulam b. Kalonymos of Lucca, Solomon b. Jehuda of Babylon, R. Gerson, Elia b. Menahem of Mans, Benjamin b. Serach, Jacob Zom Elem, Eliezer b. Samuel, Kalonymos b. Moses, Solomon Isaaki. Of exclusively Spanish poets of this period the most brilliant are—Jehuda Halevi, Solomon ben Gabirol, Josef ibn Abitur, Isaac ibn Giat, Abraham ibn Esra, Mose b. Nachman, etc. When, however, in the beginning of the 13th c., secret doctrine and philosophy, casuistry and dialectics, became the paramount study, the cultivation of the Piut became neglected, and but few, and for the most part insignificant, are the writers of liturgical pieces from this time downwards.

According to the different countries, the order and even the contents of the cycle differed, since not all liturgical pieces had been incorporated uniformly. We have thus—to name a few out of many—the rituals of Germany (Poland), of France, Spain, and Portugal (Sefardim), Italy (Rome), the Levant (Romagna), and even of some special towns like Avignon, Carpentras, Montpellier. The rituals of Barbary (Algiers, Tripoli, Oran, Morocco, etc.) are of Spanish origin. The Judæo-Chinese liturgy, it may be observed by the way, consists only of pieces from the Bible. The Jewish liturgy has, in its various forms, very frequently been commented upon, and has been translated into nearly every modern language.

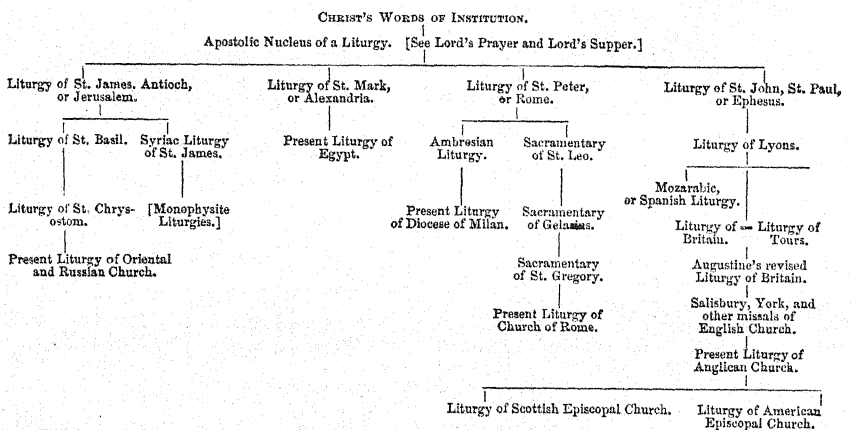
We may add, in conclusion, that liturgy forms at this moment the center of a great contest within the pale of Judaism. The "reformers" of more or less advanced tendencies are intent upon shortening the prayers, and principally upon abrogating the greater part of the Piut, as an artificial excrescence hurtful to true devotion.

LITURGY (*ante*). I. In the modern church of Rome several books are in use, some of them by the members generally, others restricted to particular ranks and orders. 1. *The Breviary* contains the daily service of the church of Rome, consisting of the matins and lauds, with variations for different days and canonical hours. It may be employed in all places, but on the model of it other books have been formed for the special use of the Benedictine, Carthusian, Dominican, Franciscan, Jesuit, and other orders. At first it contained only the Lord's prayer and portions of the Psalms, to which Scripture lessons were afterwards added. In ages called, according to the point of view from which judgment is formed, ages of superstition or ages of faith, legendary lives of the saints were inserted, which led to a frequent revision and correction of the breviary, particularly by the councils of Trent and Cologne, by popes Gregory IX., Nicolas III., Pius V., Clement VIII., and Urban VIII., and cardinal Quignon, by whom it was brought nearer to the simplicity of primitive times. At present it consists of services for seven hours, to correspond with David's declaration, "Seven times a day do I praise thee." The obligation to read this book every day, at first imposed on all, was gradually restricted to the beneficiary clergy, who, if they neglect the duty, incur the guilt of mortal sin, and forfeit a part of their revenues proportioned to their delinquencies. It is recited in Latin in Roman Catholic churches everywhere, except among the Syrian Maronites, the Armenians, and other oriental churches who, submitting to the pope's jurisdiction in other respects, are allowed to use the service in their own language (see EASTERN, OR ORIENTAL RITE). 2. *The Missal*, used in celebrating the mass and ascribed by Roman Catholic tradition to the apostle Peter. The canon of the mass, first reduced to writing in the 5th c., was afterwards enlarged, especially by Gregory the great. It is in general use throughout the Roman Catholic church. 3. *The Ceremoniale*, having special reference to the pope, is divided into three books, the first of which treats of the election, consecration, benediction, and coronation of the pope; the canonization of saints, creation of cardinals, the form and mode of holding a council; various public ceremonies to be performed by the pope as a sovereign prince; and funeral solemnities for cardinals and popes: the second book contains the divine offices which the pope celebrates, and the days devoted to them: the third prescribes the reverence due to popes, cardinals, bishops, and other persons intrusted with sacred duties; the order in which they are to be seated in the papal chapel; the sacred vestments and ornaments of popes and cardinals; and the offering of incense at the altar. 4. *The Pontificale* describes the functions of Roman Catholic bishops: the conferring of ecclesiastical orders; benedictions on abbots, abbesses, and nuns; coronation of sovereigns; consecration of churches, cemeteries, and sacred vessels; the expulsion and reconcilement of penitents; the holding of synods; suspending, reconciling, dispensing, deposing, and degrading priests, and restoring them to orders; excommunication and absolution. 5. *The Rituale*, named also the Pastorale, treats of the functions of priests or inferior clergy in their public services and private pastoral duties.

II. At the reformation the existing liturgies were modified in doctrine and translated

into the common languages of the people for use in the reformed churches. 1. Among these reformed liturgies those of Luther led the way. Different offices were prepared by him between the years 1523 and 1534. These were afterwards collected into a volume. In his "Order of Service" provision was made for morning and evening service; consisting of reading the Scriptures, preaching or expounding, with psalms and responses, and mass or communion for Sundays. Other leaders, also, in Lutheran churches, drew up liturgies for themselves. These were afterwards changed as circumstances required. No one form has been made obligatory in all Lutheran churches, yet there is substantial unity of life and spirit in them all. The rationalists of the last century neglected and mutilated the old liturgies, and strove to introduce others in place of them. But with the return to orthodoxy a salutary reaction followed, which has been shown in the study and use of the old forms and in the construction of the union liturgy, first published in 1822 under the auspices of the king of Prussia, and twice revised since then. The object of this last book is to unite the worship of the Lutheran and reformed churches in the Prussian dominions. 2. The liturgy of the renewed Moravian church is chiefly the work of count Zinzendorf, who compiled it from the services of the Greek, Latin, and reformed churches. It consists of a church litany for the usual Sunday morning service; a litany for the morning of Easter-Sunday, containing a brief confession of faith; offices for the baptism of adults and of children; litanies for funerals; offices for confirmation, the communion, and ordination; the Te Deum and various doxologies. There is also a choral with musical responses, a prayer of betrothal, a form used in the church-yards on Easter for expressing the hope of the resurrection concerning the brethren departed during the preceding year. The daily service, held in the evening, is a simple prayer meeting in which, as in the Sunday service, the prayers and exhortations are extemporaneous. 3. In the liturgy of Calvin the service began with a general confession, followed with a psalm, a second prayer, the sermon, prayer, the apostle's creed, and the benediction. There was also a long prayer for times of war and of other troubles. In the administration of the Lord's supper there was an introductory prayer, followed with a practical exhortation, the distribution of the elements, psalms, appropriate passages of Scripture, and the closing prayer. There were also simple, but long offices for baptism and marriage. The present liturgy of Geneva has been taken from Calvin's, with some modifications. It contains no responses, but has several additional prayers. It provides a service for each day of the week, for the principal festivals, and several special occasions. The Calvinistic churches of Holland, Neufchatel, and France have liturgies similar to that of Geneva. That of the church of Scotland was drawn up at Frankfort by John Knox and others on Calvin's model, and was first used by Knox in the congregation of English exiles at Geneva. Introduced by him into Scotland, its use was enjoined in 1564, and was continued after his death. Having a general order like Calvin's, it also gave a clearer discretion to the minister to use prayers of his own composition, either extemporaneous or written. It contained various offices and alternate forms. A new book, somewhat modified, was provided in 1644. In the directory of the Westminster assembly, the discretionary power allowed to the minister is greatly enlarged. The Lord's prayer is recommended as the most perfect form of devotion. Private and lay baptisms are forbidden. The communicants are to sit, instead of kneeling, at the Lord's table.

TABLE OF THE DESCENT OF THE PRINCIPAL LITURGIES NOW IN USE.



LIU-KIU, or **Liu-Tchiu**. See Loo-Choo, *ante*.

LIUTPRAND, or **Luitprand**, an author to whom we owe much of our knowledge of the history of the 10th c., was b. in Italy about the year 922. He was educated at the court of king Hugo, and entered into the service of his successor, Berengarius; but fall-

ing into disgrace at court about 955, resided for some years at Frankfort-on-the Main, followed the emperor Otto I. to Italy in 961, and was made bishop of Cremona, and afterwards sent on an embassy to Constantinople. He died about 970. His *Antapodosis* treats of the period from 886 to 948. He wrote also *De Rebus Gestis Ottonis Magni Imperatoris*, and *De Legatione Constantinopolitanâ*. The best edition of his works is in the *Monumenta Germaniæ* (1839, separately published in 1877). See Köpke, *De Vita Liutprandi* (1842).

LIVADI'A (ancient *Lebadeia*), a t. of Greece, about 60 m. n.w. of Athens. Pop. 5,000. From this place the northern part of the present kingdom of Greece used in Turkish times to be called Livadia.

LIVADI'A, an estate and palace-villa on the s. coast of the Crimea which belongs to the empress of Russia, and is the favorite summer residence of the imperial family. Livadia, which stands near the site of an old town so called, is charming by reason of its climate, its picturesque situation, and the magnificent parks and gardens which surround it.

LIVE OAK. See OAK, *ante*.

LIVE OAK, a s. co. of Texas, intersected by the Rio Nueces; 1200 sq.m.; pop. in '70, 852, of whom 28 were colored. The soil for the most part is best adapted to stock-raising, but there is considerable tillable land in the valleys. Rains in summer are infrequent. In 1870 there were in the county over 5,000 horses, more than 600 milch cows, 62,177 other cattle, 5,024 sheep, and 681 swine. Capital, Oakville.

LIVER, THE, is the largest gland in the body; it weighs from 3 to 4 lbs., and measures about 12 in. from side to side, and 6 or 7 in. from its anterior to its posterior border. It is situated in the right hypochondriac region, and reaches over to the left; being thick and indented behind, where it crosses the convex bodies of the vertebræ; convex on its upper surface, where it lies in the concavity of the diaphragm; and concave below, where it rests against the stomach, colon, and right kidney. This lower surface presents a fissure dividing the organ into a right and a left lobe.

The liver is retained in its position by five ligaments. Besides the right and left lobe, there are three smaller lobes. The great bulk of the organ is, however, made up of the right lobe, which is six times as large as the left.

The vessels of the liver are the hepatic artery, which comes off from the cœliac axis (q.v.), and supplies the organ with nutrient blood; the portal vein, which conveys to the liver the venous blood of the intestines, spleen, and stomach, and from which (after the vessel has ramified like an artery) the bile is secreted;* the hepatic veins, which convey the blood from the liver into the inferior vena cava; the hepatic duct, which carries off the bile from the liver; and the lymphatics.

The liver, both on its surface and internally, is of a dark reddish tint, which is so well known that the term *liver-colored* is universally recognized. The substance of the organ is composed of lobules held together by extremely fine areolar tissue, and ramifications of the minute branches of the various hepatic vessels. Each lobule is composed of a mass of hepatic cells, of a plexus of biliary ducts, of a portal plexus (from the contents of which the cells obtain the biliary matters that are found in their interior), of a branch of the hepatic vein, and of minute arteries. The exact mode in which the bile formed in the cells makes its way into the origin of the ducts, is not known with certainty. The numberless minute ducts gradually run into one another, until, as they emerge from the lower surface of the liver, they are reduced to two large trunks, which soon unite to form the hepatic duct. Into the hepatic duct, the cystic duct from the neck of the gall-bladder (presently to be described) enters, and the two combine to form the common duct (*ductus communis choledochus*), which opens into the duodenum (see DIGESTION). This common excretory duct of the liver and gall-bladder is about 3 in. in length, and of the diameter of a goose-quill.

The chemical composition of the liver has been studied by Dr. Beale, who finds that the organ in health contains 68.6 per cent of water, and 31.4 per cent of solid constituents—of which 3.8 are fat, 4.7 albumen, while the rest is made up of vessels, salts, and extractive matters. (In the diseased condition known as fatty degeneration of the liver —which, by the way, is artificially induced in the geese which contribute to the formation of Strasburg pie, or *pâté de fois gras*—the fat is enormously increased; in one remarkable case analyzed by Dr. Beale, it amounted to 65.2 per cent of the whole weight of the organ.) Sugar, varying in amount from 1 to 2 per cent, is also found; and inosite, uric acid, sarcine, xanthine, and leucine usually occur in traces.

The gall-bladder may be regarded as a *diverticulum* or offshoot from the hepatic duct. It has somewhat the shape of a pear, and lies in a depression on the under surface of the liver. Its use seems to be to serve as a reservoir for the accumulation of the bile, when its flow into the intestine is interrupted, as it is always found full after a long fast, and empty when digestion is going on. That the gall-bladder is not an essential appendix to the liver, is shown by the fact that it is absent in many genera of mammals. Thus,

* Recent investigations throw doubt on this view, and there are reasons for believing that the bile is secreted from the capillaries of the hepatic artery, while the portal blood contributes the material from which the liver-sugar or glycogen is formed or secreted.

it is present in the ox, sheep, and goat, but absent in the horse and many other herbivora.

It was formerly believed that the liver served merely for the separation of the biliary secretion from the blood; but there is now abundant evidence that the blood itself is changed by its means, in such a way as to show that this gland possesses an *assimilating* as well as a *depurating* action. Thus, the albuminous matter contained during digestion in the blood of the veins which pass from the intestine to the portal vein (the mesenteric veins), is very different from the albuminous matter contained in the hepatic veins; the blood, before reaching the liver, containing a crude albuminous product, while the hepatic veins contain only true blood-albumen. That the liver possesses an assimilating power on albuminous substances is also shown by the experiments of Claude Bernard, who found that, if a solution of egg-albumen be injected into any part of the systemic circulation, albumen speedily appears (like other soluble substances which are foreign to the body) in the urine, and is eliminated as an extraneous matter; but if it be injected into the portal vein, it does not appear in the urine, but becomes a normal constituent of the blood (blood-albumen), through the agency of the liver. It is now also known that if the liver does not secrete a true sugar, as Bernard supposed, it at all events secretes a substance closely allied to, and readily convertible into sugar—viz., glycogen (q.v.)—which must be regarded as a respiratory or heat-forming food. Further, it appears from Bernard's researches that fatty matters are elaborated in the liver—the blood of the hepatic veins which leave the liver containing considerably more fat than that of the portal vein which enters it. Some of this fat is doubtless burned off in the lungs; but if a deficient supply should be introduced by the lacteals, some of it would doubtless be applied to the formative processes. Lastly, during the last three days of incubation of the chick, the liver is made bright-yellow by the absorption of the yelk, which enters the branches of the portal vein, and is then converted partly into *blood-corpuscles*, which enter the circulation, and partly into bile, which is discharged into the intestine. Hence, there is distinct evidence, from several points of view, that the liver is an *assimilating* organ. The *depurating* action of this organ is exhibited in the secretion of bile (q.v.), by which the hydro-carbonaceous portion of the effete matters of the blood is removed, just as the nitrogenous portion is eliminated by the kidneys. The use of the bile in the digestive process is sufficiently explained in the article DIGESTION.

Our limited space does not allow of our noticing at any length the comparative anatomy of this important gland, which first shows itself in the form of yellowish-brown cells in the polypes, and gradually becomes more concentrated and developed in the echinoderms, annelides, nudobranchiate gasteropods, insects, crustaceans, air-breathing mollusks, cephalopods, fishes, reptiles, birds, and mammals. Till we arrive at the vertebrated classes, it consists of tubes or follicles containing cells, which stand to them in the relation of an epithelium, and its structure is easily made out; but when, as in the vertebrata, it is mainly composed of a solid parenchyma, made up of lobules, each of which is composed of aggregations of cells surrounded by the alternate ramifications of the ducts and other vessels, it presents an anatomical complexity which it is almost impossible to unravel.

LIVER (*ante*). The physiological anatomy of the liver may be briefly stated as follows: The lobules mentioned in the preceding article are about $\frac{1}{25}$ of an in. in diameter and of an ovoid shape. They are surrounded by a plexus of blood-vessels, nerves, and ramifications of the hepatic duct, comprising what are called the interlobular vessels. These are all inclosed by a sheath which is a prolongation of the proper coat of the liver (capsule of Glisson), but attached loosely by areolar tissue. This sheath follows the vessels to the subdivisions within the interlobular spaces (spaces between the lobules), but does not extend to the capillary vessels *within* the lobules. In a few animals, as the pig and polar bear, the lobular structure can be seen with the naked eye, but in man and most mammals it cannot. The lobules are intimately connected with each other, branches of the interlobular vessels being each distributed to several of the lobules. Any one lobule, however, may be considered as representing the physiological anatomy of the whole liver, and the study of its anatomy and functions will answer for the study of the whole gland. The lobules receive blood at their surfaces from the capillary terminations of the portal vein, these vessels having received the terminations of the hepatic artery before passing into the lobules. It is very important to bear in mind this peculiarity of distribution, which is often overlooked. The branches of the hepatic vein, the vessel which carries the blood from the liver to the ascending great vein (ascending vena cava), by which it is returned to the heart and lungs, have their origin *within* the lobules. Their capillary extremities arise from the capillary ramifications of the portal vein, and, passing toward the center of the lobule, converge into three or four radicles, which, uniting at the center, form the *intralobular* veins, which is the commencement of the hepatic vein. These intralobular veins, which are in the center of each lobule, are from $\frac{1}{1000}$ to $\frac{1}{400}$ of an in. in diameter, and they follow the long axis of the lobule, receiving vessels in their course till they empty into larger vessels situated at the base of the lobules. These latter vessels have been called by Kiernan sub-lobular veins. They collect the blood from all parts of the liver, and, increasing in size by union with one another, they at last form the three hepatic veins which discharge the

blood from the liver into the ascending vena cava. Now, these hepatic veins are a long way from the influence of the heart's action, lying as they do between the portal circulation and the veins going to the heart; but a provision has been made to assist in the propulsion of their contents, and they are supplied with a muscular coat, composed of unstriated muscular fibers. The minute anatomy of the liver has only recently been satisfactorily investigated, and it is to the labors of Beale, E. Wagner, Garlach, Budge, Andréjevic, Koelliker, MacGillavry, Frey, Eberth, Hering, and others that we owe nearly all the knowledge we have upon the subject. The most essential elements of the lobule, or of the liver, remain to be described. They are the hepatic cells, which are the true secreting elements of the gland. They are minute, polygonal-shaped bodies about $\frac{1}{1000}$ of an in. in their longest and $\frac{1}{1500}$ in their shortest diameter, having one nucleus, or sometimes two nuclei, with some granular matter. See CELLS. It has generally been supposed that these hepatic cells were held within a net-work of the capillaries of the portal and hepatic veins, but, according to the investigations of the above named microscopists, this is not the case. They are surrounded by an independent net-work of extremely minute vessels $\frac{1}{10000}$ of an in. in diameter, of uniform size throughout, called the biliary capillaries, and in which the bile first makes its appearance.

We must pause here to refer to the fact that the liver is an organ which has no analogue in any of the other organs of the body. It has two distinct functions, and a cellular arrangement entirely unlike that seen in any other gland. It is excretory on one hand and secreting on another, and it is its secreting function which has been so long overlooked, and the knowledge of which has also thrown so much light on the physiology of what are called ductless glands, like the spleen (q.v.) and the lymphatic glands. The liver, in one of its functions, is a ductless gland. It secretes (that is, not merely separates, but forms) a substance which is not carried away by any excretory vessel, but which is immediately returned to the blood, when it is washed away as soon as formed. The other function of the liver is the production of bile, which, although a true excretion, answers a salutary purpose in the economy. Let us now return to the consideration of the hepatic cells and the lately discovered net-work of vessels which surrounds them, called the biliary capillaries. It is with the utmost difficulty that they have been made out, and it is owing to this that so many hypotheses have been formed in regard to the histology and physiology of the liver, only to be successively abandoned. The meshes which are formed by the passing round the hepatic cells of these minute capillaries are arranged in a cubical manner, very much as if they had been woven around them. The question has been whether these biliary capillaries possessed independent walls or whether they were simply lacunar passages; but the manner in which they have been found to interlace with the blood capillaries decides the question in favor of considering them as vessels having walls, although their caliber is only $\frac{1}{10000}$ of an in., which would require the membrane which forms the tube to be inconceivably thin, and perhaps destitute of any cellular structure, as is generally found in lining membranes of most organs. The precise relations of the hepatic cells and the biliary ducts have been more particularly determined by the investigations of Eberth and Hering; and they find that they vary in different classes of vertebrata, being simpler the farther we descend in the scale of being. In amphibia, for instance, the lobular form is altered, and the bile duct passes through a tubular arrangement of hepatic cells. In reptiles the arrangement approaches more towards that of mammals, but is still far behind in development; and it is only when ascending to birds that a structure is reached capable of performing the excrementitious functions of active, warm-blooded animals. The biliary and blood capillaries never come into actual contact, but are always separated from each other by a distance somewhat less than the diameter of an hepatic cell, or about $\frac{1}{2500}$ of an inch. The biliary capillaries are undoubtedly the commencement of the finer hepatic ducts. In some diseases they become so distended with bile as to become easily discernible with a good microscope. The livers of animals dying of Texan-cattle disease were examined by the late Dr. R. C. Stiles a few years ago, and the observations of the German anatomists were completely verified. The finest bile ducts and capillaries in the livers of these animals were found filled with bright yellow bile, and their relations to the liver cells were easily distinguishable. Favoring the view that they are lined by an excessively thin membrane, Dr. Stiles found in his examinations what appeared to be detached fragments of these capillaries. Between the lobules the bile ducts are still very minute, the smallest being only $\frac{1}{2500}$ to $\frac{1}{3000}$ of an in. in diameter, and composed of a very delicate membrane lined with pavement epithelium. When they reach a size of $\frac{1}{250}$ of an in. in diameter, they are supplied with a fibrous coat, composed chiefly of inelastic, with a few elastic fibers; but the larger ducts, as afore-mentioned, are supplied with non-striated muscular fibers.

We came now to speak of another anatomical element in the structure of the liver. As the bile ducts increase in size they contain numerous follicles and cluster-like glands which are called racemose (the biliary acini of Robin), and they continue to occupy the biliary passages as far as the *ductus communis choledochus*, or the common bile duct which empties into the intestinal canal. Those which are found in the smallest ducts are simple follicles from $\frac{1}{300}$ to $\frac{1}{100}$ of an in. in length. The larger of these glands are formed of groups of these follicles, and are from $\frac{1}{300}$ to $\frac{1}{100}$ of an in. in diameter. The nutrition of the liver is provided for by the hepatic artery, whose distribution is exceed-

ingly interesting. It has three sets of branches. As soon as it enters the sheath formed by the capsule of Glisson, it sends off very fine branches, called *vasa vasorum*, to the walls of the portal vein, to those of the hepatic vein, to its own branches, and an exceedingly rich and beautiful net-work of branches to the hepatic duct. When the hepatic artery is well injected it almost completely covers the duct with its ramifications. The hepatic duct proper, or that single vessel so called lying outside of the liver, is formed by the union of two ducts, one from the right and one from the left lobe of the liver. It is about an inch and a half long, and joins the duct from the gall-bladder, called the cystic duct, to form the common duct, or *ductus communis choledochus*, which is about three inches long and of the size of a goose-quill, and empties, in common with the pancreatic duct, into the intestine, a little below the middle of the duodenum, or about 5 in. below the stomach. The gall-bladder is an elongated, pear-shaped sack about 4 in. in length and one in breadth, having a capacity of about one and a half fluid ounces. The cystic duct, connecting it with the hepatic duct, is the smallest of the three larger ducts, and is about one inch in length. In the gall-bladder there are also numerous small racemose glands similar to those above mentioned as existing in the biliary ducts generally. They consist each of from 4 to 8 follicles lodged in the submucous tissues. They secrete mucus mixed with bile. The idea has been entertained by some that these biliary racemose glands found in different parts of the biliary ducts were the bile-producing glands, while the hepatic cells were the organs for secreting sugar, or, in other words, for the conversion of the glycogenic matter of the liver into glucose, or grape-sugar; but this view has not been found tenable. The nerves of the liver are derived from the pneumogastric, the phrenic, and from the solar plexus of the great sympathetic. They all penetrate the gland at the great transverse fissure, and follow the blood-vessels in their course of distribution to the various parts of the organ, but their terminal distributions are not yet well understood. The lymphatic vessels of the liver are numerous and consist of two layers. The outer or superficial layer is situated immediately beneath the serous or peritoneal covering. The inner or deeper layer forms a plexus surrounding the lobules, having entered the liver along with the portal veins, hepatic arteries, and bile ducts, enveloped in sheaths of Glisson's capsule. In their course they invest the branches of both ducts and blood-vessels with a delicate net-work of tubes, and on arriving at the surface of the lobules they enter them and form another remarkable net-work of lymphatic passages, traversing the lobule in every direction. Every blood capillary is enveloped in a lymphatic sheath in very much the same manner that the interlobular vessels are enveloped in the sheath of Glisson's capsule. These lymphatic sheaths surrounding the other vessels are otherwise called the perivascular lymphatic spaces, and are similar in structure to those which are found in various other parts of the body. See LYMPHATICS.

The two distinct functions, that of the production of bile and the formation of sugar, which are now generally recognized as being performed by the liver have led some physiologists to suppose that this gland is composed of two distinct portions or anatomical elements, and Robin has adopted this theory and calls one portion of the liver a biliary organ, and the other a glycogenic or sugar-forming organ. The lobules and hepatic cells, with their different vessels, he regards as performing the glycogenic function, and the little racemose glands which are attached to the biliary ducts along their course as the bile-producing organs; and others have entertained ideas of the independence of the sugar-making and bile-producing portions of the organ. But from the fact that bile is commonly found in the lobules, and that the biliary capillaries are connected with the excretory biliary ducts, the conclusion seems to be unavoidable that the bile is formed in the lobules, and, moreover, by the hepatic cells. It, therefore, becomes a question as to what are the functions of the little racemose glands attached to the larger bile ducts. They have much the form of mucous glands in other portions of the body, and from the examinations of Sappey, who has found the bile to be viscid in proportion to the number of these glands in the ducts containing it, they appear to be really mucous glands. In the rabbit, an animal in which these glands are not found in this situation, the bile is quite fluid, and free from its ordinary viscidity. It has generally been thought that the bile is secreted exclusively from the blood which has been brought from the intestines by the portal vein, and that, indeed, the principal office of the liver was to separate effete matter from this portion of the venous system; but many experiments which have been made since Bernard discovered the glycogenic function of the liver go to show this idea erroneous. It has also been thought that the hepatic artery may furnish material for the secretion of bile, while the portal vein furnished that for the production of sugar; but these views again are quite overthrown by many well-established facts and experiments. It has been found that, after the ligation of the hepatic artery, bile has been secreted from blood furnished by the portal vein; and again, according to the experiments of Oré, who has succeeded in gradually obliterating the portal vein without immediately producing death, it has been found that bile is secreted from blood furnished by the hepatic artery. In one instance in which a patient died of dropsy the portal vein was obliterated, and yet the gall-bladder was full of bile. Anomalous cases have been reported where the portal vein, instead of passing through the liver, emptied into the ascending vena cava, and where also there was found no deficiency of bile. These facts point to the conclusion that the secretory elements of

the liver have an elective power, and that this gland may elaborate its products either from venous or arterial blood. The only conclusion, therefore, is that the liver produces bile from both the portal vein and the hepatic artery, and that the secretion may be kept up if either one of these vessels be obliterated. The natural color of bile is variable; in the pig it is bright yellow; in the dog, dark brown; and in the ox, greenish yellow. In general, it may be stated that it is dark green in carnivorous, and greenish yellow in herbivorous animals. Its specific gravity is variously stated. Some authorities place it at 1026; others from 1020 to 1026; and again others from 1026 to 1031. These differences are considerable, but the numbers were probably the result of exact observation, as the bile is found to differ under different circumstances. See table. Fresh bile is nearly inodorous, but after being taken from the body of an animal it soon undergoes putrefactive changes. It has been generally thought to be invariably alkaline, and this is true of that which is found in the hepatic duct, but it often has an acid reaction after it has passed into the gall-bladder.

COMPOSITION OF THE BILE, ACCORDING TO ROBIN.

Water	916.00 to	819.00
Taurocholate of soda	56.50 "	106.00
Glycocholate of soda	traces.	
Cholesterine	0.62 to	2.66
Biliverdine	14.00 "	30.00
Lecithene	3.20 "	31.00
Margarine, oleine, and traces of soaps } Choline	traces.	
Chloride of sodium	2.77 to	3.50
Phosphate of soda	1.60 "	2.50
Phosphate of potassa	0.75 "	1.50
Phosphate of lime	0.50 "	1.35
Phosphate of magnesia	0.45 "	0.80
Salts of iron	0.15 "	0.30
Salts of manganese	traces "	0.12
Silicic acid	0.03 "	0.06
Mucosine	traces.	
Loss	3.43 to	1.21
	1000.00	1000.00

The bile contains two classes of constituents, one of which are true secretions, and destined to re-enter the system and perform certain functions. They contain, with other matters, some that are formed in the liver, and are no doubt elaborated from materials furnished by the blood. These are the salts included in the above table under the names of taurocholate and glycocholate of soda. Biliverdine, the coloring matter of the bile, is probably a mixture of different coloring principles which undergo rapid change on exposure to the air. It has some analogy to the coloring matter of the blood, and it is also, like the biliary salts, supposed to be formed in the liver. This coloring matter has intense power, and in cases of obstruction of the biliary passages will give the skin and conjunctivæ a decidedly yellow color. Like hemoglobine, it contains a portion of iron, but the relative amount has never been ascertained. The other constituent of the bile is truly excretory, being composed of effete matter brought by the blood-vessels from the various parts of the system. This excretory constituent is *cholesterine*, a substance which has long been known as a constituent of the bile, whose chemical and physical characteristics were well recognized, but whose physiological relations were not understood. It was reserved for Dr. Austin Flint, jr., of New York, to discover these and make them known in the *American Journal of Medical Sciences* in 1862. Cholesterine is a normal constituent of various of the tissues and fluids of the body. It is found in the blood, liver (probably as contained in the bile), crystalline lens, spleen, meconium, and in the nervous tissue in all parts of the body. It is also found in an altered condition, as stercorine, in the fecal matter, and as unchanged cholesterine in hibernating animals. It is naturally a crystalline solid, but in the fluids of the body it is held in solution. For the form of the crystals, composition, and other characteristics, see CHOLESTERINE. This body is found in the largest quantity in the substance of the brain and nerves, and the blood coming from the brain contains a much larger percentage of it than is found in that coming from any other organ. From this and various other experiments, Dr. Flint has demonstrated that cholesterine is a disassimilative product of nervous function, and that one of the offices of the liver is to separate it from the blood. He found among other things that it is produced in much greater quantity under active conditions, and that it is also produced in all parts of the nervous system. Sometimes the liver fails to separate it from the blood, when it collects, and produces a condition to which Dr. Flint has given the name *cholesteræmia*, a species of blood-poisoning having an analogy to *uræmia*, or blood-poisoning from accumulation of urea consequent upon disease of the kidneys. In regard to the glycogenic function of the liver, it may be stated that nearly all physiologists admit that Bernard demonstrated it completely, although for a long

time many apparently well-made experiments seemed to throw great doubt on the subject, some believing that the sugar found by Bernard was a product of post-mortem changes. It is a fact that it is difficult to find sugar in the liver which may not be said to be produced after death; consequently, demonstrative experiments are exceedingly difficult. On examining the blood which comes from the lungs in animals upon which vivisection has been performed it is found to contain no sugar. Other experiments have left no doubt of the fact that, to serve some purpose in the animal economy, sugar is destroyed in its passage through the lungs, the most generally received view being that it is converted into lactic acid, which unites with the alkalies in the blood to form lactates, which again are converted into carbonates. It is thought that among the causes of the disease diabetes is an abnormal performance of the function of respiration (q.v.). The glycogenic matter of the liver, in composition, reactions, and particularly in its readiness to be transformed into sugar, has considerable resemblance to starch, and is called by some authors amyloid matter. On account of its insolubility in water it may be extracted from the liver after all the sugar has been washed out.

LIVER, Diseases of the. *Congestion* of the liver is one of the most frequent of its morbid conditions. It is most commonly caused by obstruction to the passage of the blood from the hepatic veins, arising from thoracic disease impeding the circulation through the right side of the heart. The congestion may be relieved at this stage, or may, by its obstructive action, cause congestion of the portal branches, in which case we have the liver much enlarged, the complexion dusky, the urine high colored, sedimentary, and scanty, and often more or less dropsy of the abdomen or lower extremities. The treatment must be left entirely to the physician.

Inflammation of the liver has been already noticed in the article Hepatitis.

Another important affection of the liver is that which is known by the name of *cirrhosis* (Gr. *kirrhos*, yellowish). It begins as an inflammatory affection, in which lymph (see Inflammation) is effused in the areolar tissue surrounding the branches of the portal vein. The smaller branches become obliterated by the pressure, and as the lymph subsequently contracts, larger branches of the veins and ducts become strangulated, and the surface of the organ assumes the uneven or bossed appearance known as *hobnailed*. In this affection, the liver is at first somewhat enlarged, but as the contraction of the effusion goes on, it at length becomes considerably smaller than the natural size. The ordinary cause of this disease is spirit-drinking, and it is popularly known as *the gin-drinker's liver*. The obstruction to the portal circulation occasions the effusion of serum into the peritoneal cavity; and this effusion often goes on so rapidly as soon to force up the diaphragm and impede respiration. The lower extremities soon become anasarcous, but the arms and face are never affected. The portal obstruction often also gives rise to hemorrhage from the bowels or stomach.

In a fully developed case of cirrhosis, the liver is so altered in structure that palliative treatment is all that can be attempted. This must be directed to the relief of the dropsy, and if medicines fail to remove or diminish it, temporary relief may be obtained by tapping. The disease is at best a very hopeless one.

Amongst the other affections of this organ are the *fatty liver*. The liver in this case is much enlarged, of a white color, and rounded at the edges; it is most commonly found associated with phthisis. Closely allied to this is the *lardaceous* or *waxy* liver, in which the deposited matter is not fat, but something between fat and albumen; it chiefly occurs in scrofulous young persons. Tubercle, different forms of cancer, and hydatids (q.v.) are not unfrequently found in this organ. In connection with the present subject, the reader is referred to the article Jaundice.

LIVERMORE, Abiel Abbot, b. Wilton, N. H., in 1811; graduated at Harvard college in 1833; in 1857 removed to Yonkers and became editor of the *Christian Enquirer*, a Unitarian paper in New York; since 1863 president of a theological school at Meadville, Penn. Besides contributions to magazines, Mr. Livermore is author of *A Commentary on the Four Gospels; A Commentary on the Acts of the Apostles; The Marriage Offering*, a prize essay on the Mexican war; and several other works.

LIVERMORE, George, 1809–65; b. Cambridge, Mass.; received his education at the public schools; after being carefully trained for a mercantile lif ehe entered into business in Boston as a wool-commission merchant, and was very successful. From early life he devoted his leisure hours to historical and antiquarian researches, in regard to which he became a recognized authority. His collection of editions of the Bible in different languages is believed to have been the finest in America. He was honored by an election to the Massachusetts historical society, the American antiquarian society, the American academy of arts, and the Boston athenæum. He frequently wrote upon bibliographical and historical subjects for newspapers and reviews, his contributions being invariably marked by a clear and vigorous style, and showing the results of extensive and accurate research. Among these contributions was a series of papers on the *New England Primer*, written for the *Cambridge Chronicle*, and an article in the *North American Review* on *Public Libraries;* but the most important of all his essays was *An Historical Research respecting the Opinions of the Founders of the Republic on Negroes as Slaves, as Citizens, and as Soldiers*, read before the Massachusetts historical society, Aug.

14, 1862, and published not only in the *Proceedings* of that society, but in a separate volume of 215 pages. During the war of the rebellion Mr. Livermore was a firm and generous supporter of the government, sparing neither time, strength, nor money in efforts to uphold the union. Died in Cambridge.

LIVERMORE, Mary Ashton; b. Boston, 1821; daughter of Timothy Rice; educated in the Baptist seminary for girls at Charlestown, Mass.; married D. P. Livermore, a Universalist clergyman, and assisted him for some time in editing a Universalist paper in Chicago; distinguished herself during the war of the rebellion by her labors for the soldiers, under the direction of the sanitary commission; of late years has stood in the front rank of popular lecturers upon moral and social questions, and taken a very prominent part in the total-abstinence cause, and in the movement to secure suffrage for woman. She was for several years one of the associate editors of the *Boston Woman's Journal*.

LIVERPOOL, situated on the n. bank of the Mersey, Lancashire, is, after London, the largest t. in the United Kingdom, and, taken in connection with Birkenhead, on the opposite side of the Mersey, it ranks in maritime importance before the metropolis itself —a circumstance due to its position on the w. coast of England, not only as a port for the adjacent manufacturing districts, but for the traffic with America. It is situated at one hour's distance by railway from Manchester, five hours from London, six hours from Edinburgh, and eight hours by steam from Dublin. The rise of Liverpool is remarkable. In the middle of the 14th c. it contained only 840 inhabitants and 168 cottages; whilst in 1561 its population was only 690. It was not until 1647 that it was made a free port (having been subject down to that date to the Chester officers); whilst its distinct individuality as a parish was not declared until 1697, when its population numbered about 5,000 souls, and its shipping about 80 vessels. Between 1710 and 1760 its population increased from 8,160 to 25,780, and its commercial navy from 84 vessels to 1245 vessels. In 1700 its first regular dock was built, on the site where the custom-house stands at the present day. From 1760 to 1800 the population advanced from 25,700 to 77,700 inhabitants; the shipping from 1200 vessels to 5,000 vessels; and the amount of dock dues collected, from £2,300 to £28,300; nearly two-thirds of the increase taking place during the last 15 years of the period. The rapid progress of the cotton trade was the chief cause of this almost sudden improvement. Simultaneously with the mechanical revolution brought about by Hargreaves, Arkwright, Crompton, and others, there came an increased foreign trade, and an augmented inland business, owing to the opening of the Bridgewater canal in 1773. About the same period, too, a great start was given to the ship-building trade of the port by several extensive orders received from the government, some 15 vessels of war being launched between 1777 and 1782 of very considerable tonnage, and ranging between 16 and 50 guns. By this time Liverpool had far outstripped Bristol in commercial importance, the trade of the latter port being in process of rapid transference to the former. The following statement will show how far Liverpool was benefited by the cotton trade:

Years.	Raw Cotton.		Cotton Manufactures.	Population.	Vessels.	Dock Duties Collected.
	Imported. lbs.	Exported. lbs.	Exported. £	No.	No.	£
1781.....	5,198,778	96,788	355,000	35,000	2,300	5,000
1791.....	31,447,605	363,442	1,875,000	50,000	4,200	10,000
1800.....	43,378,278	4,416,610	6,040,000	77,000	5,000	28,000

But this progress, important as it was, has been far exceeded by the subsequent increase of business, and at the present time, as regards exports, Liverpool stands at the head of British commercial ports, and is excelled by London alone in its imports. Its rapid growth will be seen from the following table:

Years.	Population.	Vessels.	Tonnage.	Dock Dues.
1801.....	77,708	5,060	459,719	£28,365
1831.....	205,572	12,537	1,592,436	183,455
1861.....	443,938	21,095	4,977,272	444,417
1871*.....	493,346	20,121	6,131,745	562,953

The following table will show the comparative importance of the export and import trade of Liverpool:

* Including West Derby and Birkenhead, the pop. in 1871 reached 650,510, against 557,027 in 1861.

DECLARED REAL VALUE OF BRITISH AND IRISH EXPORTS AND IMPORTS IN 1877.

	Exports.	Imports.
Liverpool	£72,864,643	£99,145,818
London	59,985,826	140,390,333
Hull	17,816,719	18,966,385
Grimsby	7,509,439	4,076,796
Glasgow	8,829,253	10,713,587
All others	31,877,185	121,126,763
	£198,883,065	£394,419,682

This gigantic trade has given being to the magnificent system of docks, extending along the margin of the river for a distance of about 5 m., containing 54 docks and basins, covering an area of over 260 acres, and having nearly 19 m. of quay space. The whole of these docks have, with the exception of the Salthouse, King's, part of the George's, and part of the Queen's, been built since 1812. They were erected chiefly under the superintendence of the late Jesse Hartley, esq., and are considered by all who have seen them to be one of the greatest engineering triumphs of the present century. Several of the docks are inclosed with large warehouses: the erection of those round the Albert dock cost £358,000, and the dock itself £141,000. In addition to the usual pier approaches, there are two large floating landing-stages, one of which is 1002 ft. in length, 80 ft. in width, and 4,500 tons in weight. In the general traffic of Liverpool, that carried on by large steamers with United States, Canadian, South American, Mediterranean, Australian, and other ports, has deservedly attained celebrity, and draws large numbers of passengers to the town.

The approaches to the town on the land sides are the Lancashire and Yorkshire, East Lancashire, London and North-western, Great Northern, Midland and Manchester, Sheffield and Lincoln railways. There are four tunnels under the town in connection with the London and North-western railway, and one in connection with the Midland railway, taking different directions, varying from a mile and a half to two miles and a half in length. The passenger stations in Lime street, Ranelagh street, and Tithebarn street are large and handsome buildings.

The architecture of the town has been wonderfully improved within the past thirty or forty years, and especially during the latter half of the period, and it now possesses many fine thoroughfares, thronged with numerous splendid edifices. There are several large and elegant squares in the e., or fashionable part of the town, and a number of thoroughfares, lined with the private residences of the merchants and tradesmen; while the outskirts of the town are studded with the mansions of the commercial aristocracy. Of what may be termed the official buildings—the town-hall, St. George's hall, public offices, custom-house, sailors' home, police-offices, workhouses, baths and wash-houses, waterworks, and gas offices, are the most noteworthy; next follow the various literary and educational edifices, such as the free library and museum, presented to the town by sir William Brown, at a cost of £40,000; the Walker art gallery, presented by A. B. Walker, esq., at a cost of £30,000; botanic gardens, observatory, the Liverpool college, Liverpool institute, queen's college, medical institute, royal institution, the various schools attached to the national and other churches, academy of fine arts, the exchange, lyceum, and atheneum, news-rooms and libraries, and numerous associations devoted to commercial, political, and religious affairs. That the inhabitants are not niggardly is proved by the fact that there are about 100 charitable institutions in the borough devoted to the alleviation of the various evils that flesh is heir to. Among the more prominent are the royal infirmary, northern and southern hospitals, industrial schools, blue-coat orphan schools; male, female, and infant orphan asylums and church; school, workshops, and church for the blind; deaf and dumb, and eye and ear institutions; homeopathic and other dispensaries; lying-in and other hospitals. Visitors will find no lack of hotel accommodation, with such immense establishments as the North-western, Adelphi, Washington, Queen's, Alexandra, Royal, Angel, and a score or two of minor importance. The buildings dedicated to amusements are quite in keeping with the other characteristics of the town. Under this head there are the Philharmonic hall, capable of accommodating 3,000 people; the Alexandra theater; the amphitheater, calculated to hold 5,000; the two concert-rooms of St. George's hall, before alluded to, the larger of which is acknowledged to be one of the finest rooms in the kingdom; St. James's hall, the Queen's hall, the Theater-Royal, Prince of Wales's theater, Rotunda theater, Adelphi theater, circus, etc. The religious wants of the community are supplied by about 187 churches and chapels, of which 73 belong to the established church, 21 to Roman Catholics, 21 to Presbyterians, 13 to Wesleyans, 16 to Independents, 16 to Baptists, and 27 to miscellaneous non-conformists, including 3 Unitarian, 2 Jewish, 1 German, and 1 Greek. There are 8 cemeteries, one only of which is situated within the town, namely, St. James's, Duke street, the remainder being laid out in the suburbs.

The buildings devoted to commercial pursuits are also very fine and numerous, and not the least interesting to the stranger. Amongst these are the exchange, the Albany,

Apsley, Brown's, Richmond, Hargreaves, Liverpool and London insurance chambers, Royal insurance, and Queen insurance buildings (all local companies), Manchester, Knowsley, Walmer, Drury, Tower, India, and Brunswick buildings, and many others. There are 12 banks in the town, and several of them are possessed of very large and handsome business premises. Amongst these may be named the branch of the bank of England, and the Liverpool, Union, District, Commercial, National, and North and South Wales banks. In the principal streets there are also several very extensive trade establishments, devoted to every department of business, wholesale and retail. Of monuments, the chief are those of the queen, prince Albert, Nelson, Wellington, Huskisson, and William IV., besides several in the town-hall, St. George's hall, free library, and parks. The parks are four in number, the Stanley, the Sefton, the Prince's, and the Botanic.

The stated market days are Wednesday and Saturday, for general agricultural produce, and Tuesday and Friday for corn. The fairs for horses and cattle are held July 25 and Nov. 11. The corn trade transacts its business in the corn exchange, Brunswick street, and there is an extensive market for the cattle-dealers in Kensington. For agricultural produce there is the northern hay market. For edibles of all kinds there are St. John's market, 183 yards long, 43 yards wide, and lighted by 136 windows; St. James's, Gill street, and St. Martin's markets; there is also a fish market, and several fancy bazaars. There are 6 daily and 7 weekly newspapers, besides the *Daily Telegraph* and *Bill of Entry*, exclusively devoted to shipping matters, and three weekly literary periodicals. Liverpool has several extensive ship-building yards, iron and brass foundries, chain-cable and anchor smithies, engine-works, tar and turpentine distilleries, rice and flour mills, tobacco, cigar and soap manufactories, breweries, sugar refineries, roperies, glass-works, alkali-works, chronometer and watch manufactories. It returns 3 members to parliament.

LIVERPOOL, a t. in Nova Scotia, on the river Mersey, 70 m. s.w. from Halifax; pop. 3,102. It is a port of entry, has a fine harbor with light-house and revolving light, and is an active commercial and manufacturing center, making castings, machines, boots and shoes, and edge-tools, besides being engaged in ship-building. The inhabitants are also largely employed in lumbering and fishing; and considerable quantities of the product of these industries are exported to Europe and the West Indies.

LIVERPOOL, Charles Jenkinson, first earl of, 1727–1808; b. Oxfordshire, Eng.; educated at the charter-house school, London, and the university of Oxford. In early life he published *Verses on the Death of Frederick, Prince of Wales;* a *Dissertation on the Establishment of a National and Constitutional Force in England Independently of a Standing Army;* and a *Discourse on the Conduct of Government respecting Neutral Nations.* In 1761 he became one of the under-secretaries of state, and the same year was elected to parliament; in 1763 was appointed joint secretary of the treasury; in 1766, made lord of the admiralty by the Grafton administration; in 1772 appointed one of the vice-treasurers of Ireland; in 1776, minister of the mint; was secretary of war, 1778–82; in 1783 was appointed by Pitt a member of the board of trade. In 1785 he published a *Collection of all the Treaties of Peace, Alliance, and Commerce between Great Britain and other Powers, from the Treaty of Munster in* 1648 *to the Treaties signed at Paris in* 1783. In 1786 he was made chancellor of the duchy of Lancaster, created baron Hawkesbury, and appointed president of the board of trade; in 1796 was made earl of Liverpool. After this he withdrew mostly from public life.

LIVERPOOL, Robert Bankes Jenkinson, second earl of, 1770–1828; educated at the charter-house school and Christ-church college, Oxford; traveled on the continent, and was in Paris at the breaking out of the French revolution and the destruction of the bastile. Returning to England he was elected to parliament in 1790, but did not take his seat till the following year as he had not yet attained his majority. In 1792 he opposed Mr. Wilberforce's motion for the abolition of the slave trade. In 1793 he was appointed one of the commissioners of the India board of trade. In 1796, his father being created earl of Liverpool, he took his title of lord Hawkesbury, and was made commissioner of Indian affairs. On the retirement of Mr. Pitt in 1801 and the appointment of the Addington ministry, he was appointed secretary of state for the foreign department, and negotiated the treaty of Amiens. On the return of Pitt to power, Liverpool was home secretary 1805–7, and, on the death of Pitt, was offered the premiership, but declined. In 1808, on the death of his father, he became earl of Liverpool. Upon the dissolution of the Fox and Grenville administration in 1807 he again refused the premiership, but accepted the home department under Percival, on whose assassination in 1812 Liverpool became prime minister, with the title also of the first lord of the treasury. His administration extended from 1812 to 1827. His opposition to parliamentary reform, to Roman Catholic emancipation, to the abolition of the slave trade, and the emancipation of the slaves in the West Indies, his severe measures to repress internal disturbances, and his introduction of the bill of pains and penalties against queen Caroline, rendered him very unpopular, especially in Scotland. He was attacked with paralysis, and during the last three months of his life was helpless and imbecile.

LIVERWORTS. See Hepaticæ, *ante.*

LIV'ERY, in English law, denotes the act of giving or taking possession. It is most frequently used in the phrase "livery of seisin," corresponding to the Scotch infeftment or sasine.

LIV'ERY (from Lat. *liberatio*), a word applied in its origin to the custom which prevailed under the Merovingian and Carlovingian kings, of delivering splendid habits to the members of their households on great festivals. In the days of chivalry the wearing of livery was not, as now, confined to domestic servants. The duke's son, as page to the prince, wore the prince's livery, the earl's son bore the duke's colors and badge, the son of the esquire wore the livery of the knight, and the son of the gentleman that of the esquire. Cavaliers wore the livery of their mistresses. There was also a large class of armed retainers in livery attached to many of the more powerful nobles, who were engaged expressly to use the strong hand in their master's quarrels. By the colors and badge of the retainer was known the master under whom he served. The livery colors of a family are taken from their armorial bearings, being generally the tincture of the field and that of the principal charge, or the two tinctures of the field are taken instead, where it has two. They are taken from the first quarter in case of a quartered shield. These same colors are alternated in the wreath (q.v.) on which the crest stands. The royal family of England have sometimes adopted colors varying from the tinctures of the arms. The Plantagenets had scarlet and white; the house of York, murrey and blue; white and blue were adopted by the house of Lancaster; white and green by the Tudors; yellow and red by the Stuarts, and by William III.; and scarlet and blue by the house of Hanover. An indispensable part of the livery in former times was the badge (q.v.) The church of Rome has its liveries for apostles, confessors, martyrs, virgins, and penitents.

The freemen of the 91 guilds or corporations which embrace the different trades of London, are called liverymen, because entitled to wear the livery of their respective companies. In former times the wardens of the companies were in use yearly to deliver to the lord mayor certain sums, 20 shillings of which was given to individuals who petitioned for the money, to enable them to procure sufficient cloth for a suit, and the companies prided themselves on the splendid appearance which their liveries made in the civic train. The common councilmen, sheriffs, aldermen, and some other superior officers of the city are elected by the liverymen of London; and till the reform bill in 1832, they had the exclusive privilege of voting for members of parliament for the city.

LIVERY COMPANIES, or GUILDS. See GUILDS; LIVERY; *ante*.

LIVERY OF SEISIN. See FEOFFMENT, *ante*.

LIVIA DRUSILLA, B.C. 56–A.D. 29; married early to Tiberius Claudius Nero, by whom she had two sons—Tiberius and Drusus. While pregnant with the latter she met Augustus, whom she so fascinated by her beauty that he compelled her husband to surrender her to him, at the same time divorcing his own wife, Scribonia. The married life of Augustus and Livia is said to have been in most respects happy; but it was marred at the close by the suspicions of the husband that the wife, in spite of her apparent devotion to his person and interests, had plotted the overthrow of the natural heirs of his throne. One by one the members of the large and brilliant family of Augustus had been ruined, and the aged emperor found himself alone in the palace with Livia and her son Tiberius, whom he was constrained to adopt and make his heir. The Roman people execrated her, and her son Tiberius, after his ascent to the throne, showed her no favor or respect. He even refused to visit her in her dying moments, or to take any part in the funeral rites. She survived Augustus 15 years, dying at Rome.

LIVINGSTON, a co. in n.e. Illinois; 1026 sq.m.; pop. '80, 38,453. Traversed by the Vermilion river, and by the Chicago and Alton; Toledo, Peoria, and Warsaw; and Illinois Central railroads. The soil is fertile, the surface generally level. Productions: Indian corn, wheat, oats, potatoes, and hay; other staples are wool and butter. There are a number of manufactories of carriages, metal goods, saddlery and harness, etc. Co. seat, Pontiac.

LIVINGSTON, a co. in w. Kentucky, having the Ohio river on the n. and the Tennessee on the s., and intersected by the Cumberland; 275 sq.m.; pop. '80, 9,165. The soil is fertile. Productions: wheat, Indian corn, oats, tobacco, and potatoes. There are a few flour and saw mills, but no other important manufactures. Co. seat, Smithland.

LIVINGSTON, a s.e. parish of Louisiana, having the Amite river on the s. and w., and the Tickfah intersecting it; 650 sq.m.; pop. '80, 5,258. The surface is level and the soil fertile, producing cotton, Indian corn, rice, sweet-potatoes, and sugar-cane. Co. seat, Springfield.

LIVINGSTON, a co. in s.e. Michigan, traversed by the Red Cedar, Huron, and Shiawassee rivers, and by the Detroit, Lansing, and Lake Michigan railroad; 576 sq.m.; pop. '80, 22,251. The soil is fertile, and produces heavily of wheat, Indian corn, oats, and potatoes; wool, butter, hay, and hops are also staple products. Co. seat, Howell.

LIVINGSTON, a co. in n.w. Missouri, traversed by the Grand river and crossed by the Hannibal and St. Joseph and a branch of the St. Louis, Kansas City, and Northern railroads; 510 sq.m.; pop. '80, 20,205. The productions are Indian corn, oats, wheat,

tobacco, hay, potatoes, butter, and wool. There are a number of mills and manufactories of flour, lumber, metal wares, sash, doors, and blinds, etc. Co. seat, Chillicothe.

LIVINGSTON, a co. in w. New York, intersected by the Genesee river and canal, drained by Honeoye and Canaseraga creeks, and traversed by the N. Y. Central and Erie railroads, and branches of the latter; 650 sq.m.; pop. '80, 39,573. The surface is varied, being hilly in parts, and is generally well wooded. The fertile and beautiful Genesee valley lies in this county and is one of its chief features, the soil being highly productive. The principal agricultural products are Indian corn, wheat, barley, hay, and oats; butter and wool are also important staples. The Avon saline-sulphurous springs are in this country, and are much frequented by persons suffering from rheumatism and from cutaneous diseases, as to which the waters are believed to exercise a specific remedial influence. This county has valuable quarries of sandstone. Co. seat, Geneseo.

LIVINGSTON, Brockholst, ll.d., 1757–1823; b. N. Y.; son of William; educated at Princeton, and in 1776 entered the army on gen. Schuyler's staff. He was afterward with Arnold, and was brevetted maj. and col. In 1779 he became secretary to John Jay. After the war he studied law, and in 1802 was appointed a judge of the N. Y. supreme court. For the last 17 years of his life he occupied the eminent position of judge of the U. S. supreme court, and died at Washington.

LIVINGSTON, Edward, an American jurist and statesman, was b. on May 26, 1764, at Livingston (afterward Claremont), in the state of New York. He belonged to a family which, for nearly a century, had been of the greatest weight and distinction in the colony. Livingston was the son of Robert Livingston, judge of the supreme court of New York, and the youngest of a very numerous family. After leaving the college of Princeton, he studied law under his brother Robert, 18 years his senior (see below), and devoted special attention to Roman jurisprudence. On being called to the bar, he soon obtained an extensive practice. He had spent his youth among the founders of American independence, all of whom he had known as visitors of his father, and he at once attained a prominent position. He was elected a member of congress in 1794; federal attorney and mayor of New York in 1801; and he would probably have been known only as a prosperous lawyer had not a great misfortune at this period befallen him. Livingston, as federal attorney, was intrusted with the collection of debts to the state recovered by legal proceedings. He had the greatest aversion to accounts, and intrusted this part of his duty to a clerk, a Frenchman, who appropriated the funds to his own purposes. When Livingston discovered what had happened, he at once ascertained the balance due to the state, handed over his whole property to his creditors, threw up his appointment, and resolved to quit New York. No entreaty on the part of his fellow-citizens could induce him to remain. Louisiana had just been annexed to the United States, thanks to negotiations conducted by his brother at Paris, and he resolved to settle in the new state. He joined the New Orleans bar in 1804, and at once obtained lucrative practice. He had great difficulties to encounter. The business had to be conducted partly in French and Spanish. The law administered was a strange compound of municipal regulations, Spanish and French law, and the Roman law of the civilians. A proposal was made to introduce the common law of England, and this would have been much to the pecuniary advantage of Livingston, but he opposed the scheme in an eloquent and convincing speech to the Louisiana chambers, and it was decided that the law of the state should remain based upon the civil rather than the common law. In the dispute with England in 1814 and 1815, Livingston became aid-de-camp and secretary to gen. Jackson, and attracted much notice by the admirable bulletins he wrote during the campaign. In 1820 he was appointed to draw up a code of civil procedure for Louisiana. It was the simplest known up to that time, was found to work admirably, and received the warmest approval from Bentham and other jurists. Livingston was then employed in reducing to system the civil laws of Louisiana. He had to aid him in the task the French and other modern codes, the nomenclature of Scotch law, and a familiar acquaintance with all that is most valuable in English jurisprudence, and the work produced, the "Civil Code of Louisiana," is undoubtedly the most successful adaptation of the civil law to the conditions of modern society. It was adopted in Louisiana in 1823, and has since become the law of many other states. Livingston was then employed to prepare a new criminal code, and in a preliminary treatise he laid down the principles on which he was to proceed. He proposed the abolition of the punishment of death, and a penitentiary system, which at once drew general attention to his labors. His book was reprinted in London, translated into French, and made a sensation all over Europe, and the author received the congratulations of the most eminent publicists and politicians of England, France, and Germany. His code of crimes and punishments was completed, but not adopted without modifications. Livingston was elected in 1829 member for Louisiana of the American senate, and in 1831 appointed secretary of state for foreign affairs. Two years later he went to France as minister plenipotentiary to support a demand of a million sterling made by the U. S. government for indemnity on account of French spoliations, and he succeeded in securing payment. He had married a lady of New Orleans, of French family and education, had been long conversant with the French language, in which he had been accustomed to plead before the courts of

New Orleans, and he became intimately acquainted with the leading jurists and politicians of France. He was admitted an associate of the academy of moral and political sciences, and received the warmest tribute of respect as one of the greatest philosophical lawyers of his time, although his distinction at home had been chiefly won as a careful and painstaking man of business. Livingston died on May 23, 1836, at his own estate on the Hudson, in consequence of drinking cold water when very hot.—See notices of his life in French by M. Taillandier and by M. Mignet, and a long biography by Mr. H. Hunt, with introduction by S. Bancroft.

LIVINGSTON, HENRY BEEKMAN, 1750–1831; b. at Livingston manor, N. Y.; son of judge Robert R. Raising a military company in 1775, he joined Montgomery's expedition to Canada. For gallant conduct at the capture of Chambly, congress voted him a sword of honor. In 1776 he became aide-de-camp to gen. Schuyler, and later in the same year col. of the 4th battalion of New York volunteers, resigning in 1779. Bred to the law, he successively filled the posts of attorney-gen., judge, and chief-justice of the supreme court of New York. He was also president of the New York society of Cincinnati; and during the war of 1812 he received the appointment of brig.gen. Died at Rhinebeck.

LIVINGSTON, JOHN. See LIVINGSTON, ROBERT R., *ante*.

LIVINGSTON, JOHN HENRY, D.D., 1746–1825; b. N. Y.; graduated at Yale college in 1762; studied theology at Utrecht, Holland; ordained at Amsterdam in 1770; received the title of D.D. from Utrecht; returning to the United States, became pastor of the Dutch church in New York, and during the war preached in Albany, Kingston, and Poughkeepsie; appointed professor of divinity by the general synod of America in a seminary opened under his direction at Bedford, L. I., in 1795, which being united in 1807 with Queen's (now Rutger's) college, New Brunswick, he became its president and professor of theology. He spent the remainder of his life in New Brunswick.

LIVINGSTON, PHILIP, 1716–78; b. Albany, N. Y.; grandson of John Livingston, to whom grants of land on the Hudson river were made by George I. A graduate of Yale college in 1737, he became a successful merchant in New York, a member of its city council, and a member from the city to the colonial assembly of New York from 1758 to 1769. He was elected to the continental congress, and is best known as one of the signers of the declaration of independence. He was in service in that congress then in session at York, Penn., at the time of his death. He was distinguished, like all the family, for resolute patriotism in aiding the cause of the colonies in their struggle for independence.

LIVINGSTON, ROBERT R., brother of EDWARD, an eminent lawyer and politician, was b. in New York in 1746. He was one of the five members of the committee charged with drawing up the declaration of independence. When the constitution of the state of New York was settled, he was appointed chief judge, a dignity he retained till 1801. He was then sent to Paris as minister plenipotentiary to negotiate the cession of Louisiana to the United States, a duty he discharged with rare ability. He enabled Fulton to construct his first steamboat, and introduced in America the use of sulphate of lime as a manure, and the merino sheep, and in many other ways distinguished himself as a national benefactor. He died Mar. 26, 1813.

The Livingstons, whose lives have just been recorded, belong to an American family remarkable for hereditary talent and the large number of its members who have distinguished themselves in the United States as eminent men of letters, magistrates, lawyers, and divines. They descend lineally from the fifth lord Livingston, who was intrusted with the guardianship of Mary queen of Scots, and from the Rev. John Livingston, minister of Ancrum, in Teviotdale, the grandson of the nobleman, one of the most distinguished of the Presbyterian divines. John Livingston was born at Kilsyth, on June 21, 1603, preached with great success in Ireland, and was one of two commissioners sent by the Scotch kirk to Breda, in Holland, to treat with Charles II. Refusing to take the oath of allegiance, he was banished, and in 1663 went to Holland, where, as pastor of the Scotch kirk at Rotterdam, he spent the last years of his life. He was the author of several works, the best known of which is his autobiography. His son Robert was born at Ancrum in 1654, and while still a lad emigrated to America, and settled in the Dutch village of Albany, in the region of the upper Hudson. He bought from the Indians a vast tract of land on the banks of the river, embracing upwards of 160,000 acres; and this property he had erected into the lordship and manor of Livingston.

LIVINGSTON, WILLIAM, LL.D., 1723–90; b. Albany; brother of Philip (q.v.); graduated at Yale, 1741; governor of New Jersey, 1776–90. He was elected to the continental congress of 1774, was a delegate to the constitutional convention of 1787, and the author of a number of legal and political treatises. His life was one of patriotic devotion as jurist, legislator, and magistrate.

LIVINGSTONE, DAVID, African traveler and missionary, was a native of Scotland, and was born at Blantyre, in Lanarkshire, in the year 1817. At the age of ten he became a "piecer" in a cotton-factory, and for many years was engaged in hard work as an operative. An evening-school furnished him with the opportunity of acquiring some

knowledge of Latin and Greek, and finally, after attending a course of medicine at Glasgow university, and the theological lectures of the late Dr. Wardlaw, professor of theology to the Scotch Independents, he offered himself to the London missionary society, by whom he was ordained as a medical missionary in 1840. In the summer of that year he landed at Port Natal in s. Africa. Circumstances made him acquainted with the rev. Robert Moffat, himself a distinguished missionary, and whose daughter he subsequently married. For 16 years Livingstone proved himself a faithful and zealous servant of the London missionary society. The two most important results achieved by him in this period were the discovery of lake Ngami (Aug. 1, 1849), and his crossing the continent of s. Africa, from the Zambesi (or Leeambye) to the Congo, and thence to Loando, the capital of Angola, which took him about 18 months (from Jan., 1853, to June, 1854). In Sept. of the same year he left Loando on his return across the continent, reached Linzanti (in lat. 18° 17′ s., and long. 23° 50′ e.), the capital of the great Makololo tribe, and from thence proceeded along the banks of the Leeambye to Quilimane on the Indian ocean, which he reached May 20, 1856. He then took ship for England. In 1857 Livingstone published his *Missionary Travels and Researches in South Africa*, a work of great interest and value. Returning in 1858 as British consul at Quilimane, he spent several years in further exploring the Zambesi, in ascending the Shiré, and discovering lake Shirwa and lake Nyassa—the Maravi of the old maps. A narrative of these discoveries was published during a visit he paid to England in 1864–65. In the mean time, lakes Tanganyika, Victoria Nyanza, and Albert Nyanza had been discovered by Burton, Speke, and Baker, but the true source of the Nile was still a problem. With a view to its solution, Livingstone, in 1866, entered the interior, and nothing was heard of him for two years. The communications received from him afterwards describe his discovery of the great water-system of the Chambeze in the elevated region to the s. of Tanganyika. It flows first w. and then turns northward, forming a succession of lakes, lying to the w. of the Tanganyika. To determine its course after it leaves these, whether it joins the Nile or turns westward and forms the Congo, was the grand task which Livingstone seemed resolved to accomplish or perish. He was much baffled by inundations, the hostility of the slave-dealers, and by the want of supplies, which were habitually delayed and plundered by those who conveyed them. When nothing certain had been heard of him for some time, Mr. Stanley, of the *New York Herald*, boldly pushed his way from Zanzibar to Ujiji, where, in 1871, he found the traveler in great destitution. On parting with Mr. Stanley, Livingstone started on a fresh exploration of the river-system of the Chambeze or Lualaba, convinced that it would turn out to be the head-waters of the Nile. In May, 1873, however, he died at Ilala, beyond lake Bemba. His body was brought home in April, 1874, and interred in Westminster abbey. His *Last Journals* were preserved, and published in Dec., 1874.

LIVINGSTONE, DAVID, LL.D. (*ante*). When left by Mr. Stanley at Unyanyembe in Mar., 1872, it was his intention to remain in Africa only about a year longer, and then to return to England for permanent residence. In the following Aug., having received men and supplies from Zanzibar, he led an expedition toward the e. side of lake Bangweolo and the supposed sources of the streams which form the Lualaba. From this time no news of his explorations was received from his own hand, and accurate details of this last journey are entirely wanting. An expedition, under the auspices of the royal geographical society, and commanded by lieut. Cameron, was sent to the relief of the explorer early in 1873. Leaving Zanzibar on Mar. 18, this relief-party began its quest. Having reached Unyanyembe in Aug., lieut. Cameron first heard of Livingstone's death. On Oct. 16 the intelligence was confirmed by the arrival there of a body of natives bearing the remains of the explorer, and bringing a letter from his negro servant, Wainwright. It appeared that the explorer, after enduring great hardships, had been attacked with dysentery, from which he died after a fortnight's illness. The party in charge of his remains encountered great difficulties and endured much suffering, but by the aid of lieut. Cameron they succeeded in reaching the coast. *The Last Journals of David Livingstone, including his Wanderings and Discoveries in Eastern Africa from* 1865 *to within a few days of his Death*, in 2 vols., edited by the Rev. Horace Waller, appeared in London in 1874; and *The Personal Life of David Livingstone, LL.D., D.C.L.; chiefly from his Unpublished Journals and Correspondence in the Possession of his Family;* by William Garden Blaikie, D.D., LL.D., was published in London in 1879. Both these works have been republished in New York. Dr. Livingstone was the recipient of honors from most of the geographical societies of the world; the academy of sciences in Paris elected him a corresponding member, and in 1871 the British government granted to his family a pension of £300. See AFRICA.

LIVINGSTONE RIVER. See CONGO, *ante*.

LIVINGSTONIA MISSION, of which the chief settlement is at cape Maclear at the s. end of lake Nyassa (q.v.), was based on a suggestion made by Dr. Livingstone that this lake was the best position for the establishment of a mission with a view to the annihilation of the Portuguese and Arab slave-trade on the e. of Africa. Acting on this suggestion, an expedition, costing about £6,000, was equipped in 1875 by the Scotch Presbyterian churches for establishing a mission here. Another station called Blantyre has been planted in the Shiré highlands, within easy distance of the lake. As yet the chief

industries are iron manufacture, basket-making, and cloth manufacture from the bark of trees and cotton. With the exception of the 70 m. of the Murchison falls, there exists unbroken water communication between the head of Nyassa and the Indian ocean.

LIVIUS, TITUS, the most illustrious of Roman historians, was b. at Patavium (Padua), in 61 B.C. according to Cato, but according to Varro in 59 B.C., the year of the great Cæsar's first consulship. We know nothing of his early life, except that he practiced as a rhetorician and wrote on rhetoric. There is internal evidence which makes it probable that he did not commence his great history till he was drawing near middle age. He lived to see his eightieth year; and having been born under the republic, died under Tiberius. His fame was so thoroughly established and widely spread, even during his lifetime, that a Spaniard traveled from Gades to Rome only to see him. Quintilian, in claiming for the Romans equal merit in the department of history with the Greeks, compares Livius to Herodotus, and there is no doubt that his countrymen regarded him as their greatest historical writer. The story that Asinius Pollio pretended to discover a certain provincialism or *patavinity* in his style is probably false; but even if it be true, modern criticism is unable to discover in what the peculiarity consisted; for Livius's work is one of the greatest masterpieces of Latin or of human composition. Originally the Roman history of Livius was comprised in 142 books, divided into *tens* or *decades;* but only 30 books, with the greater part of 5 more, now exist. Instead of a complete narrative from the foundation of the city to the historian's own time, we have detailed portions, the most valuable of which are the first decade, containing the early history, and the third, containing the wars with Hannibal. Among the surviving fragments of what is lost is a character of Cicero, preserved in the *Suasoria* of Seneca, the execution of which makes us deeply regret that time has not spared Livius's account of the transactions of his own period.

In classing Livius in his proper place among the great historians of the ancient and modern world, we must not think of him as a critical or antiquarian writer—a writer of scrupulously calm judgment and diligent research. He is pre-eminently a man of beautiful genius, with an unrivaled talent for narration, who takes up the history of his country in the spirit of an artist, and makes a free use of the materials lying handiest for the creation of a work full of grace, color, harmony, and a dignified ease. Prof. Ramsay has remarked that he treats the old tribunes just as if they were on a level with the demagogues of the worst period; and Niebuhr censures the errors of the same kind into which his Pompeian and aristocratic prepossessions betrayed him. But this tendency, if it was ever harmful, is harmless now, and was closely connected with that love of ancient Roman institutions and ancient Roman times which at once inspired his genius and was a part of it. And the value of his history is incalculable, even in the mutilated state in which we have it, as a picture of what the great Roman traditions were to the Romans in their most cultivated period. The literary talent most conspicuous in Livius is that of a narrator, and the English reader perhaps derives the best idea—though it is but a faint one—of his quality from the histories of Goldsmith or the *Tales of a Grandfather* of sir Walter Scott. He does not rival Tacitus in portraiture or in tragic power, but no writer has ever surpassed him in the art of telling a story; and the speeches which, according to the antique fashion, he puts into the mouths of his historic characters are singularly ingenious, pointed, and dramatically real. There is also something in a high degree winning and engaging about what we may call the moral atmosphere of Livius's history, which nobody can read without feeling that the historian had a kindly tender disposition—a large, candid, and generous soul. The *editio princeps* of Livius, which did not contain all that we now have of the work, was published at Rome about 1469, and MSS. of parts of Livius were existing in that century which have since disappeared. The most celebrated editions are those of Gronovius, Crevier, Drakenborch, and Ruddiman; and, in recent times, esteemed recensions of the text have been issued by Madvig, Alschefski, and Weissenborn.

LIV'IUS ANDRONI'CUS, the father of Roman dramatic and epic poetry, was a Greek by birth, probably a native of Tarentum, and flourished about the middle of the 3d c. B.C. He translated the Odyssey into Latin Saturnian verse, and wrote tragedies, comedies, and hymns after Greek models. Mere fragments are extant, of which a collection may be found in Bothe's *Poetæ scenici Latini* (vol. 5, Halberst, 1823) and Düntzer's *Livii Andronici Fragmenta Collecta et Illustrata* (Berlin, 1835).

LIV'NY, an ancient district t. of Great Russia, in the government of Orel, in lat. 52° 25′ n., long. 37° 37′ east. Pop. '67, 13,470, who carry on an extensive trade in corn, cattle, and honey.

LIVO'NIA (Ger. *Lievland*), one of the three Baltic provinces of Russia, to which belong also the islands of Oesel, Man, and Runo, contains an area of 18,088 sq.m., with a pop. of (1870) 1,000,876. The country is mostly flat, and one-fourth of it is covered with wood. The soil is only of moderate fertility; but nevertheless agriculture and cattle and sheep breeding are brought to a high degree of perfection. Livonia has many extensive factories and distilleries belonging to the government, also some cloth manufactories, one of which, situated near Pernau, is very extensive. The inhabitants of the country are

of Finnish and Lettish descent; those in the towns are chiefly Germans, with a sprinkling of Russians, Poles, and Jews. Livonia, up to the 17th c., included the three Baltic provinces of Courland, Livonia, and Esthonia.

LIVORNO. See LEGHORN.

LIVRE, the name of an ancient French coin, derived from the Roman *libra,* or *as* (q.v.). There were livres of different values, the most important being the *livre Tournois* (of Tours), which was considered the standard, and the *livre Parisis* (of Paris), which was equal to five-fourths of a livre Tournois. In 1795 the livre was superseded by the franc (80 francs = 81 livres Tournois).—LIVRE was also the ancient French unit of weight, and was equal to 17.267 oz. avoirdupois; the kilogram (see GRAM) has taken its place.

LIVY. See LIVIUS, *ante.*

LIXIVIATION (Lat. *lix,* ashes), a term employed in chemistry to denote the process of washing or steeping certain substances in a fluid, for the purpose of dissolving a portion of their ingredients, and so separating them from the insoluble residue. Thus, wood-ash is lixiviated with water to dissolve out the carbonates of soda and potash from the insoluble parts. The solution thus obtained is called a *lixivium* or *lye.*

LIXU'RI, a t. of the island of Cephalonia, on the w. shore of the gulf of Argostoli. It is a Greek bishop's see. Pop. 7,000.

LIZARD, *Lacerta,* a genus of saurian reptiles, the type of a numerous group, in which monitors (q.v.), etc., are included, and to which the *megalosaurus* and other large fossil saurians are referred. The name lizard is indeed often extended to all the saurian reptiles; but in its more restricted sense it is applied only to a family, *lacertidæ,* none of which attain a large size, whilst most of them are small, active, brilliantly colored, and bright-eyed creatures, loving warmth and sunshine, abounding chiefly in the warmer parts of the old world. They have a long, extensile, forked tongue; the body is generally long, and terminates in a rather long tail; the feet have each five toes, furnished with claws; the upper parts are covered with small, imbricated scales; the scales of the under parts are larger; a collar of broad scales surrounds the neck; the bones of the skull advance over the temples and orbits; the back part of the palate is armed with two rows of teeth. They feed chiefly on insects. Britain produces only two well-ascertained species: the SAND LIZARD (*L. agilis* or *L. stirpium*), about 7 in. long, variable in color and marking, but generally sandy brown on the upper parts, blotched with darker brown, and having a lateral series of black, rounded spots, each of which has a yellowish-white dot or line in the center; and the COMMON LIZARD, or VIVIPAROUS LIZARD (*zootoca vivipara*), smaller, more slender, very variable in color, a dark-brown generally prevailing on the upper parts. The former species is comparatively rare; it inhabits sandy heaths: the latter is abundant in dry moors and sand-banks. They differ remarkably in the former being oviparous, the latter viviparous, or, more strictly speaking, ovoviviparous. Both are harmless creatures, as are all the rest of this family. Larger species are found in the more southern parts of Europe. Some of the lizards are quite susceptible of being tamed. They are remarkable for the readiness with which the end of the tail breaks off; the flinging of a glove or handkerchief on one when it is trying to make its escape is often enough to cause the separation of this portion, which lies wriggling whilst the animal hastens away. The lost portion is afterwards reproduced. Lizards become torpid in winter.

LIZARD, in heraldry, means either (1) the reptile usually so called or (2) a beast somewhat resembling the wild-cat, and said to be found in several countries of northern Europe, represented with brown fur and large spots of a darker shade.

LIZARD POINT. See CORNWALL.

LIZARD'S TAIL, the *saururus cernuus* (Lin.), of the natural order *sauraceæ,* a perennial plant growing in marshes and along the edges of ponds and slow streams in New York and westward and northward. Its stem is about 2 ft. high and rather weak; leaves alternate, petiolate, heart-shaped, entire, pointed, convergingly ribbed, slightly hairy, and pale green underneath. The flowers are in a slender, crowded, terminal, spike-like, gracefully curved raceme, about 4 in. long, having no calyx or corolla, the pistils, 6 or 7 in number, standing in the axis of a bract. Fruit rather fleshy, wrinkled, and composed of three to four pistils united at the base. The entire plant has an aromatic but rather unpleasant odor and a somewhat acrid taste. The root has been used for making poultices for abscesses and other painful swellings.

LLAMA, *Auchenia lama,* a most useful South American quadruped of the family *camelidæ.* It is doubtful whether it ought to be regarded as a distinct species, or as a mere domesticated variety of the huanaca (q.v.). It was in general use as a beast of burden on the Peruvian Andes at the time of the Spanish conquest, and was the only beast of burden used by the natives of America before the horse and ass were introduced by Europeans. It is still much used in this capacity on the Andes, the peculiar conformation of its feet (see AUCHENIA) enabling it to walk securely on slopes too rough and steep for any other animal. The working of many of the silver mines of the Andes could scarcely be carried on but for the assistance of llamas. The burden carried by the

llama should not exceed 125 pounds. When too heavily loaded the animal lies down and refuses to move, nor will either coaxing or severity overcome its resolution. It is generally very patient and docile. Its rate of traveling is about 12 or 15 m. a day. The llama is about 3 ft. in height at the shoulder, has a longish neck, and carries its head elevated. The females are smaller and less strong than the males, which alone are used for carrying burdens. The color is very various, generally brown with shades of yellow or black, frequently speckled, rarely quite white or black. The flesh is spongy, coarse, and not of a very agreeable flavor. The hair or wool is inferior to that of the alpaca, but is used for similar purposes; that of the female is finer than that of the male. The llama has been introduced with the alpaca into Australia; but it is only for steep mountain regions that it seems to be adapted.

LLANDAFF (*llan Taff*, the place of a church on the Taff), a city of s. Wales, in the co. of Glamorgan, is situated on the right bank of the Taff, 3 m. above Cardiff, in a district remarkable for its beauty. It is the seat of a bishopric, the revenue of which is £4,200. Pop. about 700.

LLANDUD'NO, a very fashionable watering-place in the co. of Caernarvon, n. Wales, is situated between the Great and Little Orme's Heads, 40 m. w.s.w. of Liverpool. The air is described as "delicious," and there is every facility for sea-bathing, and extensive healthy rambles. Pop. in '71, 2,762.

LLANEL'LY, a parliamentary borough, manufacturing town, and seaport of s. Wales, in the co. of Caermarthen, and 16 m. s.e. of the t. of that name. The mineral wealth of the vicinity, and the easy access to the sea, have raised the town to considerable commercial importance. The Cambrian copper-works employ a great number of the inhabitants; but there are also silver-, lead-, iron-, and tin-works, and a pottery. Coal is largely exported. In 1877, 2,935 vessels, of 207,251 tons, entered and cleared the port. Pop. of parliamentary borough in 1871, 15,281.

LLANGOL'LEN, a small t. of n. Wales, in the co. of Denbigh, picturesquely situated on the right bank of the river Dee, 22 m. s.w. of Chester. It is visited by tourists on account of the beauty of the famous vale of Llangollen, and for its antiquities, among which is the fragment of the round inscribed pillar of Elisy.

LLAN'IDLOES, a municipal and parliamentary borough of n. Wales, in the co. of Montgomery, 19 m. w.s.w. of the t. of that name. Its church is one of the most beautiful in Wales. Considerable manufactures of flannel and other woolen fabrics are carried on. Llanidloes unites with several other boroughs in sending a member to parliament. Pop. '71, 3,428.

LLA'NO, a w. central co. in Texas; bounded by the Colorado, and intersected by the Llano and its affluents; 900 sq.m.; pop. '70, 1379. It is arid and stony the inhabitants being devoted chiefly to stock-raising. The minerals abound, including gold, lead, iron, silver, and antimony. Salt and building-stone also are found. Co. seat, Llano.

LLA'NO ESTACA'DO, a desolate plateau of n.w. Texas and s.e. New Mexico, having an area of more than 40,000 sq.m., and an elevation of from 3,200 to 4,700 ft., with a general slope northward. It has but a scanty supply of water, and is covered with a sparse coating of grass in the wet season. Its scanty shrubs have large roots, which are used for fuel. Attempts made by gen. Pope in 1852 to obtain water by means of artesian wells met with little success.

LLA'NOS are vast steppes or plains in the northern portion of South America, partly covered with tall luxuriant grass, and partly with drifting sand, and stocked with innumerable herds of cattle. They resemble the more southern pampas (q.v.) and the North American savannas (q.v.). The inhabitants, a vigorous race of shepherds, are called llaneros.

LLAN'QUIHUE, a district of the department of Valdivia in southern Chili, between the river Buena on the north and the gulf of Ancud; 8,350 sq.m.; pop. about 43,000. It is mostly a fertile plain drained by the river Maullin, and largely peopled by Germans engaged in agriculture and grazing. The climate resembles that of Ireland, though the winters are less severe. It is the favorite part of Chili with emigrants from Europe, because more nearly resembling the northern coast of Europe in soil, production, and climate than other portions of Chili. Three volcanoes are among the Andes upon its eastern side. Port Montt, on the gulf of Ancud, is the principal town.

LLERE'NA, a t. in the Spanish province of Badajoz, and 63 m. s.e. of Badajoz. The inhabitants are mostly employed in agriculture. Pop. 6,000. Near Llerena lord Combermere with his cavalry routed, on April 11, 1812, a French force of 2,500 cavalry and 10,000 infantry, the rearguard of Soult, under Drouet, retiring after the capture of Badajoz.

LLEWELL'YN AP GRIFFITH, Prince of Wales, d. 1282. He succeeded David, 1246; revolted from his allegiance to the English in 1256, but made peace with Henry III. in 1268. Edward I. summoned him to attend parliament at Westminster both in 1274 and 1276, but he refused to appear. His wife, Eleanor de Montfort, was captured by the English in the channel in 1275, and his offers of a ransom for her were declined. The English invaded his territory and were successfully repelled; but in 1277 he surren-

dered his domains and was taken to Westminster. He subsequently returned to Wales, and, after being reconciled to his brother David, renewed the war with the English. He was surprised and killed by Mortimer in 1282.

LLORENTE, JUAN ANTONIO, a Spanish historian, was b. at Rincon del Soto, near Calahorra, Mar. 30, 1760. He was educated by his maternal uncle, and received orders in 1779. He took his degree in canon law, and was named successively advocate of the council of Castile in 1781, vicar-general of Calahorra (1782), and finally secretary of the inquisition in 1789. Llorente was from an early period attached to the liberal party. On the fall of Jovellanos he was deprived of his employments, and remained in disgrace till 1805, when he recovered favor as the reward of a literary service of a very questionable character which he rendered to Godoy, by a historical essay against the liberties of the Basque provinces. On the intrusion of the Napoleon dynasty Llorente became a zealous partisan of the French, and an active instrument of the French policy, to which he lent all his support at the press, as well as in office; and being obliged to fly, on the restoration of Ferdinand, he fixed his residence in Paris, where he published the work to which his celebrity is chiefly due—his *Critical History of the Inquisition.* This work, which professes to be founded on authentic documents, although throwing much light on a subject previously inaccessible, has, in the judgment of impartial historians, as Prescott, Ranke, and others, lost most of its value by its plainly partisan character, and by the exaggerations in which it abounds. See INQUISITION. Written by Llorente in Spanish, it was translated into French, under the author's eye, by Alexis Pellier (Par. 1817–18), and has been translated into most of the European languages. Llorente published, during his residence in Paris, several other works, some literary, as his *Critical Observations on Gil Blas;* some polemical, as his *Portraits Politiques des Papes;* and others, it is alleged, of a more questionable character in a moral point of view. His work on the popes led to his being compelled to quit Paris in 1822, and a few days after he reached Madrid he died, Feb. 5, 1823. He was also the author of *Memoirs of the Spanish Revolution,* 3 vols. 8vo, 1819, and an *Essay on a Religious Constitution,* 1819. Most of his works were published both in Spanish and in French.

LLOYD, THOMAS, 1649–94; b. at Dolobran, north Wales; educated at Oxford, but was converted to Quakerism, and, as a preacher of that sect, suffered much persecution; in 1684 accompanied William Penn to America, and was acting-governor and president of the council of Pennsylvania, 1684–86, and deputy-governor, 1691–93.

LLOYD, WILLIAM, D.D., 1627–1717; bishop of Worcester; b. Tilehurst, Berkshire; educated at Oriel college, Oxford; became fellow of Jesus college in 1646; ordained deacon in 1648; was tutor in a gentleman's family; rector of Bradwell in 1654; ordained priest in 1665, and made chaplain to Charles II.; received the title of doctor of divinity in 1667. Passing through several of the lower grades of church preferment he was made dean of Bangor in 1672, bishop of Exeter in 1676, and of St. Asaph in 1680. He took an active part in the troubles between the Romanists and Protestants in 1678. In 1688 he, with six other bishops, presented a protest to the king against the publication of his declaration of indulgence to Romanists and dissenters, and was with the others soon after imprisoned in the Tower. When tried they were acquitted. He was a warm supporter of the revolution, and was appointed almoner to William and Mary soon after their arrival in England. In 1692 he was transferred to the see of Coventry, and promoted in 1699 to the bishopric of Worcester. He furnished valuable materials to bishop Burnet's *History of His Own Times,* and besides many pamphlets on the Roman Catholic controversy, a few tracts on ecclesiastical subjects and several sermons, published *A Chronological Account of the Life of Pythagoras and of his famous Contemporaries; A Dissertation on Daniel's Seventy Weeks;* and *A System of Chronology.*

LLOYD'S, a set of rooms on the first floor of the royal exchange, London, frequented by merchants, ship-owners, underwriters, etc., for the purpose of obtaining shipping intelligence, and transacting marine insurances. One large room, with small rooms attached to it, is set apart for the use of the *underwriters,* and there two enormous ledgers lie constantly open, the one containing a list of vessels *arrived,* the other recording disasters at sea. In the same series of rooms there is a self-registering anemometer and anemoscope for the use of the underwriters; also a valuable collection of charts for consultation. See INSURANCE, MARINE. The extent of business transacted here may be imagined when we consider that the value annually insured amounts to above £40,000,000. None but members of Lloyd's, who have duly paid the fees, are allowed to transact business there either as insurance-brokers or underwriters. The shipping intelligence is furnished by agents appointed for the purpose, and there is scarcely a port of consequence where one is not stationed. The agent receives no salary, his labor being amply compensated by the advantages he derives from the connection. The intelligence contained in the ledgers is also diffused over the country every afternoon by the publication of *Lloyd's List.* There are two other rooms—the *reading room,* which is merely an extensive news-room; and the *captains' room,* where auctions of ships are carried on, and where captains and merchants can meet together in a sociable manner. The society of Lloyd's is managed by a committee of twelve, selected from among the members, who also appoint the agents and officials of the establishment. The expenses are defrayed by fees and annual subscriptions.

Lloyd's Register of British and Foreign Shipping is a volume published annually, and containing information respecting vessels, their age, materials, repairs, owners, captains, etc. This information is supplied by salaried agents at the different ports. The office of the *Register* is quite distinct from Lloyd's of the exchange.

The name *Lloyd's*, which is now generically applied, arose from the circumstance that the head-quarters of the London underwriters was originally Lloyd's coffee-house. See Martin's *History of Lloyd's*, 1876.

LLOYD'S, AUSTRIAN, an association for general, commercial, and industrial purposes, was founded in Trieste by baron Bruck in 1833, to supply the want, experienced by the maritime insurance companies of that port, of a central administration to attend to their common interests. This association, like its London prototype, has agents in all the principal foreign ports, whose duty it is to collect all information of a nature to affect the commerce and navigation of Trieste, and to keep a list of all entrances and clearances of ships at their respective ports. This information is published in the *Giornale del Lloyd Austriaco*. This company has established regular communication between Trieste and all the important seaports in the Adriatic and Levant, by means of a large fleet of steamers, which also carry the Austrian mails. The society of Austrian Lloyd's includes three sections: the first is composed of insurance companies, the second of steamboat companies, while the third or scientific department (established in 1849) has a printing-press, an engraving-room, and an artistic establishment for the perfecting of engraving on copper and steel. This last section has issued a great number of literary and scientific journals.

LLOYD'S BONDS, the name given to a species of securities introduced by Mr. John Horatio Lloyd, the eminent barrister, and much employed by railway and other companies, whose power of borrowing money on mortgage or bond is derived from and limited by acts of parliament. A Lloyd's bond is an admission under seal of a debt being due by the company issuing the bond to the person in whose favor it is executed, with a covenant to pay the sum due at a time fixed, and to pay interest at a certain rate from the time of issue until payment. The covenant is made by the company, their successors and assigns, with the obligee, his executors and administrators; so that a Lloyd's bond on the face of it is not assignable, and is not, properly speaking, a negotiable instrument. The value of it consists in its converting a simple contract or ordinary debt into a specialty debt, by which the holder gains a preference over ordinary creditors; and in its enabling the holder, armed with this preference, to raise money upon the faith of the debt, either by assigning his interest in it, or by depositing the bond as a security for advances. A valid Lloyd's bond, as a security, appears to be inferior to a debenture issued under statutory authority in no respect except that its validity can be put in question.

As railway and other companies which have come into existence under parliamentary authority have no powers except those which parliament has conferred upon them, their power of borrowing is limited to the amounts and must be exercised in the manner which parliament has prescribed. By the act 7 and 8 Vict. c. 85, s. 19, it is declared illegal for them to grant any loan-notes, or other negotiable or assignable instrument, in security of money advanced, except so far as they are authorized by statute. In general, they have statutory authority to borrow only when a certain portion (usually the whole) of their capital has been subscribed, and a certain portion of it has been paid up. And the statute 8 and 9 Vict. c. 16 (the companies' clauses consolidation act) provides that their power of borrowing must be exercised under the authority of a general meeting. Previous to the introduction of Lloyd's bonds, these restrictions upon borrowing really limited the liabilities of companies. They were severely felt by companies whose works were being made or being extended; which often were in need of money, which it was impossible or impolitic to raise by means of calls, and whose borrowing powers had not come into operation, or could not conveniently be resorted to. Mr. Lloyd relieved such companies from their difficulties, and to a certain extent defeated the intentions of parliament by taking advantage of the fact that companies, if they were prevented from borrowing, were not prohibited from getting into debt in any other way, and granting acknowledgments of their indebtedness in any form except perhaps that of a negotiable instrument. For work done, for goods delivered, for anything except money advanced, the directors of a company might grant admissions of indebtedness; and Mr. Lloyd supplied a form in which such admissions would become almost as binding on a company as a statutory debenture, in which they could be sufficiently marketable, in which they could be conveniently granted by directors on account of all the important objects for the sake of which they could desire to borrow to any extent, without the sanction of a general meeting of the shareholders. The only drawback upon the usefulness (for their purpose) of Lloyd's bonds has been, that they have only been negotiable at high rates of discount; but this has not prevented companies from using them, in many cases to a dangerous extent. There are instances in which lines have been, for the most part, made by means of Lloyd's bonds; and they have constantly been used simply as a colorable means of eluding the statutory restrictions upon borrowing. On the other hand, they have been of considerable service to companies in the first period of their existence; and that, on the whole, they are thought to have been useful may perhaps be inferred from their implied

recognition by statute; the regulation of railways act, 1868 (section 3, sched. i., No. 13), directing the amount due on "Lloyd's bond and other obligations not included in the loan capital statement," to be set forth as an item in the "general balance sheet," which, under this act, every company requires to prepare half-yearly.

It results, from what has been stated, that a Lloyd's bond cannot be granted for money lent, but can be granted for any other antecedent debt. It cannot be granted for money lent, though the money has actually been used in paying off debts for which bonds might have been granted. The bond should state the origin of the debt on account of which it is granted, but this is not essential. The courts will in no case assume that a Lloyd's bond has been issued in breach of statutory provisions; but evidence of an intention to defeat such provisions will invalidate a bond. If there have been no actual debt (as may happen when a company's accounts with a contractor are unsettled), the instrument will not create one; and in that case, the obligee or holder will not be able to recover, even though the obligee *bonâ fide* believed that a debt existed. Directors are not personally responsible upon a Lloyd's bond improperly issued. The leading case upon this subject is that of Chambers *v.* the Manchester and Milford-Haven railway company (5 Best and Smith's Rep., 588), decided by the court of queen's bench in June, 1864. A review of the whole series of cases on this subject up to the date of the decision will be found in the case of *In re* Bagnalstown and Wexford railway company, 1870 (Irish Reports, 4 Eq. 505). The form of this instrument (which must be duly stamped) is as follows: "The A. and B. railway company do hereby acknowledge that they stand indebted to C. D. in the sum of £1000 for money due and owing from the said company to the said C. D., in respect of work and labor done for the said company by the said C. D. And the said company for themselves, their successors and assigns, hereby covenant with the said C. D., his executors and administrators, to pay to him, his executors, administrators, and assigns, the said sum of £1000 upon the 1st day of May, 1869, and also interest thereon at the rate of 5 per cent per annum from the date hereof until payment; such interest to be payable half-yearly, on the 1st day of January, and the 1st day of July in each year.—Given under the common seal of the said company, the 1st day of May, 1866.—X. Y., *Secretary.*"

LLUMAYOR', or LLUCH-MAYOR, a t. of the island of Majorca, in an inland situation, among mountains, 15 m. s.e. from Palma. It has manufactures of linen and woolen fabrics. Wine and brandy are also produced. Pop. 7,000.

LOACH, *Cobitis*, a genus of fishes of the family *cyprinidæ*, having an elongated body, covered with small scales, and invested with a thick mucous secretion; a small head, a small toothless mouth surrounded with 4 to 10 barbules; small gill-openings, and three branchiostegous rays. One species, the COMMON LOACH (*C. barbatula*), called in Scotland the *beardie*, is common in rivers and brooks in Britain. It seldom exceeds 4 inches in length; is yellowish-white, clouded, and spotted with brown; feeds on worms and aquatic insects; and is highly esteemed for the table. It generally keeps very close to the bottom of the water.—The LAKE LOACH (*C. fossilis*) of the continent of Europe, is sometimes a foot long, with longitudinal stripes of brown and yellow. It inhabits the mud of stagnant waters, coming to the surface only in stormy weather. The flesh is soft and has a muddy flavor.

LOADSTONE, or MAGNETIC IRON ORE, a mineral consisting of a mixture of peroxide of iron and protoxide of iron; sometimes occurring in grains, as *iron sand*, in trap rocks, sometimes in beds in primitive rocks, as in Scandinavia, where it is a valuable ore of iron. It is remarkable for its highly magnetic quality; and indeed magnetism was first known as belonging to it. It is of a black color; and occurs in concretions, and crystallized in octahedrons and rhomboidal dodecahedrons.

LOAM (Ger. *Lehm*, allied to Lat. *limus*, mud, and to *lime*, *slime*), a term much employed by agriculturists and others to designate a soil consisting of a mixture of clay, sand, and lime, with animal and vegetable matters in a state of intimate mixture. The clay varies from 20 to 50 per cent; the proportion of lime is generally not more than 5 per cent. Loamy soils are among the best and most fertile of soils. They are not stiff and tenacious like clay soils, and they are much more fertile than sandy soils. Even in mere *mechanical* properties, they are superior to both. The "clay" used for making bricks is often really a loam in which the proportion of true clay is large. In Italy, France, and other countries, walls are made of loam beaten down between planks placed at the requisite width; and these walls become very solid, and last for centuries.

LOAN, in law (LOAN OF MONEY, *ante*), signifies either the delivery of money or any personal chattel by one person to another for which an equivalent return is to be made; or the bailment of a personal chattel to be returned in kind. In the case of the loan first mentioned, if the thing loaned be other than money, and its equivalent be not returned to the lender, he may recover its value with interest, if so specified, and costs, in a suit at law. But the specific article itself cannot be recovered at law, since the award of damages offers the lender, as a rule, a sufficient remedy. Yet equity will sometimes enforce specific performance of such a contract. But equity will not enforce, for instance, a contract for the delivery of a stock of which shares are easily procurable. The most ordinary contract of loan for which an equivalent is to be returned is a loan

for money. This loan makes the parties to it debtor and creditor, instead of bailor and bailee. If there have been no express contract of loan, the law will imply one, with interest to be computed from the time the loan was made. The second class of loans belongs to the class of gratuitous bailments, the delivery of an article to the bailee, for his use, without compensation, and on condition of its return to the bailor. As this kind of bailment is entirely to the advantage of the bailee, he is bound to use extraordinary care, and is responsible for slight negligence, in the use of the bailment. He is not responsible for the natural deterioration by ordinary wear and tear of the article delivered, but with that exception must return the article to the bailor in as good condition as when it was received. The diligence to which the bailee is held in the care of the property depends upon its character and value, and the circumstances to which it is exposed. If the bailee refuse to deliver the property when the bailment has expired, after demand made, he may be sued in trover or replevin.

LOAN ASSOCIATION, BUILDING. See CO-OPERATION.

LOAN'DA, ST. PAUL DE. See SAINT PAUL DE LOANDA, *ante*.

LOAN'GO, a maritime kingdom of s.w. Africa, extends on the coast from cape Lopez, in lat. 0° 44′ s., to the river Congo or Zaire, which separates it on the s. from the country of Congo. Forests cover a great portion of the country, which is mountainous toward the s.e. On the coast the surface is level and fertile; the interior is not yet well known. Formerly, the chief trade was in slaves; ivory and wax now form the chief exports. The inhabitants are skillful in the manufacture of baskets, variously dyed mats, grass-cloth, wooden spoons, figures, etc. At the town of Kabinda, near the n. bank of the Congo (pop. from 10,000 to 18,000), boats and canoes, the former almost equal to those of English make, are built. Trade is free to all nations. The king is considered a divinity, and the government is an absolute despotism. Polygamy prevails, and a man's wives are, at his death, handed down by inheritance, like the rest of his goods. The religion is an idolatrous superstition. Loango, the chief town, is situated 130 m. n. of the mouth of the Congo river, near the coast. The pop., including the villages in the vicinity, amounts to about 20,000.

LOAN OF MONEY is an implied contract, by which B, the borrower, agrees to pay L, the lender. There are various modes by which B gives an acknowledgment for a loan, as by giving a bond or a promissory note, or I O U (q.v.), the last of which requires no stamp. But no writing is necessary to constitute the contract, which may be proved by parole, and often is proved by the lender's oath, confirmed by circumstantial evidence or letters of the borrower. The debt must in general be sued for in six years in England and Ireland. In Scotland, a borrower is much more favored, for there are only two ways of proving the loan if it exceeds £8 6s. 8d., viz., by some writing of the borrower, or by staking the truth as to whether the money is really due on the borrower's oath. Hence, if a hundred witnesses saw the loan advanced, but there was no writing, or the borrower, when put to it, denied it on oath, he can escape liability entirely.

LOASA'CEÆ, a natural order of exogenous plants, natives of America, and chiefly from the temperate and warmer parts of it. There are about seventy known species, herbaceous plants, hispid with stinging hairs. They have opposite or alternate leaves, without stipules, and axillary 1-flowered peduncles. The calyx is 4 to 5 parted; the petals 5, or, by an additional inner row, 10; often hooded. The stamens are numerous, in several rows, sometimes in bundles. The ovary is inferior, 1-celled; the fruit capsular or succulent.—Some of the species are frequently to be seen in hot-houses and flower-gardens. The genus *loasa* sometimes receives the popular name of CHILI NETTLE.

LOBAU, an island about 5 m. below Vienna, in the Danube; is noted for its connection with the battle of Aspern, between Napoleon I. and the Austrians under archduke Charles, May 21–2, 1809. Napoleon connected it by bridges with both banks, and crossed to the left bank on the 21st. On the night of the 22d, the defeated French regained the island and held it until July 4, when the river was again crossed and the battle of Wagram won on July 6. The title count Lobau was bestowed on gen. Mouton for conduct in the first attempt.

LÖ'BAU, a t. of Saxony, 40 m. e. of Dresden. Near it are mineral springs and bathing establishments. It has tanneries, mills, and bleaching-fields. In the ancient *Rathhaus,* the deputies of the six towns of Lusatia met from 1310 to 1814. "Lobau diamonds" are crystals found here. Pop. '75, 6,226.

LOBAU, GEORGES MOUTON, Comte de, 1770–1838; b. France. A favorite and impetuous soldier in the campaigns of Napoleon, and by him made count of Lobau, in compliment for his valuable service in the Austrian campaign of 1809. He was taken by the English at Waterloo; returned to France in 1818; and was in obscurity until the revolution of 1830, when on the resignation of Lafayette he was made commanding general of the national guard of Paris. He distinguished himself at this time by suppressing a series of gatherings on the streets of Paris intended to organize a revolution in favor of the Bonaparte dynasty, by deluging the mob with water from fire-engines. The success of the experiment was the theme of innumerable caricatures.

LOBEIRA, or LOVEIRA, VASCO DE, a Portuguese writer of the 14th c.; d. 1404. Educated to the profession of arms, he was eminent only as the author or supposed author of a romance that has survived the centuries, and which appeared under the title of *Los quatros libros del Cavallero Amadis de Gaula.* It is known in the French translation as *L'Amadis de Gaul.*

LOBEL, or DE L'OBEL, MATTHIAS, 1538–1616; b. Lille, France; educated as a physician. He traveled through Europe, and was at one time physician to William of Orange; afterwards given a position as botanist in England under James I. He was a close student of vegetable physiology, making new classifications by means of evident analogies of growth. The class of plants called *Lobelia* was named in compliment to him. He was author of *Stirpium Adversaria Nova,* London, 1570; *Plantarum seu Stirpium Historia,* Antwerp, 1576; and *Icones Stirpium,* Antwerp, 1581.

LOBE'LIA, a genus of exogenous plants of the natural order *lobeliaceæ.* This order is nearly allied to *campanulaceæ,* one of the most conspicuous differences being the irregular corolla. It contains almost 400 known species, natives of tropical and temperate climates, abounding chiefly in damp woods in America and the n. of India. They are generally herbaceous or half-shrubby, and have a milky juice, which is often very acrid, and often contains much caoutchouc. A poisonous character belongs to the order, and some are excessively acrid, as *tupa fuillei,* a Chilian and Peruvian plant, of which the very smell excites vomiting; yet the succulent fruit of one species, *centropogon surinamensis,* is eatable.—The genus *Lobelia* is the only one of this order of which any species are British. The WATER LOBELIA (*L. dortmanna*) is frequent in lakes with gravelly bottom, often forming a green carpet underneath the water with its densely matted, sub-cylindrical leaves. The flowers are blue, the flowering stems rising above the water.—To this genus belong many favorite garden flowers, as the beautiful CARDINAL FLOWERS (*L. cardinalis, L. fulgens,* and *L. splendens*) and the BLUE CARDINAL (*L. syphilitica*), natives of the warmer parts of North America, perennials, which it is usual to protect during winter in Britain. To this genus belongs also the INDIAN TOBACCO of North America (*L. inflata*), an annual, with an erect stem, a foot high or more, with blue flowers, which has been used as a medicine from time immemorial by the aborigines of North America, and was introduced into this country in 1829 by Dr. Reece. Both the flowering-herb and the seeds are imported. It is the former, compressed in oblong cakes, which is chiefly employed. The chemical constituents of Lobelia are not accurately known. A liquid alkaloid, *lobelina,* and a peculiar acid, to which the term *lobelic acid* has been applied, have been obtained from it.

In small doses, it acts as diaphoretic and expectorant; in full doses (as a scruple of the powdered herb), it acts as a powerful nauseating emetic; while in excessive doses, or in full doses, too often repeated, it is a powerful acro-narcotic poison. It is the favorite remedy of a special class of empirics, and consequently deaths from its administration are by no means rare. Physicians seldom prescribe it now, except in cases of asthma.

In a case of poisoning by this drug, the contents of the stomach should be withdrawn as speedily as possible. If the stomach pump is not at hand, an emetic of sulphate of zinc or of mustard should be administered.

LOBIPE'DIDÆ, a family of birds of the order *grallæ,* nearly allied to *rallidæ* (rails, crakes, gallinules, etc.), but differing in having the toes separately margined on both sides with a scolloped membrane, thus forming an interesting connecting link with the web-footed birds, or order *palmipedes.* The general appearance of many of the lobipedidæ also approaches to that of the *anatidæ.* Coots and phalaropes are examples of this family. They are all aquatic, some of them frequenting fresh, and others salt water; some often found far out at sea on banks of sea-weed.

LOBLOLLY BAY. See GORDONIA, *ante.*

LOBLOLLY-BOY, the name applied on board ship to the man who assists the medical officers in the "sick-bay," or hospital.

LOBO, JERONIMO, 1595–1678; b. Lisbon; joined the order of Jesuits in 1609; was made in 1621 professor in the Jesuits' college at Coimbra, but ordered to resign and repair as a missionary to India, embarked in 1622, and arrived in Goa the same year. In 1624 he left India and went to Abyssinia to Christianize that country, whose ruler had been converted to the Roman Catholic faith by father Paez in 1603. Disembarking on the coast of Mombas and vainly attempting to enter Abyssinia by land, he returned, and the next year, renewing the attempt, he landed on the coast of the Red sea with Mendez, the patriarch of Ethiopia, and eight missionaries, and reached Fremona, where was the missionary settlement. Here he remained for several years as superior of the missions in the state of Tigré, and was very successful. The death of the emperor Segued leaving the Roman Catholics without a protector, Lobo and all the Portuguese, numbering 400, with the patriarch, bishop, and 18 Jesuits, were expelled by his successor from the country. All fell into the hands of the Turks at Massowah, and Lobo was sent to India to procure a ransom for his imprisoned associates. He accomplished his object, but was unsuccessful in his endeavor to induce the Portuguese viceroy to send an army against Abyssinia. He then embarked for Portugal, was shipwrecked on the coast of

Natal and captured by pirates. Reaching Lisbon he was sent to Madrid, as Portugal was then under the king of Spain, and endeavored to enlist the government in his scheme to convert Abyssinia to the Roman church by force. But neither at Lisbon, Madrid, nor Paris did his plan meet with favor. He then set out for Rome to lay his favorite idea before the pope, but here also he received no encouragement. He returned to India in 1640, and became rector and afterwards provincial of the Jesuits at Goa. Returning to Lisbon in 1656 he engaged in literary pursuits, and in 1659 published the narrative of his journey to Abyssinia, entitled *Historia de Ethiopia*, which was translated into French by the abbé Legrand, who added a continuation of the Roman Catholic missions in Abyssinia after Lobo's departure, and an account of the expedition of Poncet, a French surgeon from Egypt. This is followed by some dissertations on the history, religion, government, etc., of Abyssinia. The whole was translated into English by Dr. Johnson in 1735. Lobo was remarkable for enterprise and perseverance.

LO'BOS ISLANDS, two small groups of rocky islands on the coast of Peru, famous for the great quantity of guano which they produce. The southern point of the northern group, *Lobos de Tierra*, is in s. lat. 6° 29′; the southern group, *Lobos de Affuera*, is 25 m. farther south. The northern group is about 12 m. from the mainland. The principal island of this group is about 5 m. long and 2 m. broad. The southern group consists chiefly of two islands separated by a narrow channel, the largest being about 2 m. long.

LOBSTER, *Homarus*, a genus of crustaceans of the order *decapoda*, suborder *macroura* (see CRAYFISH), differing from crayfish (*astacus*), to which, in general form and characters, they are very similar, in having the *rostrum* in front of the carapace not depressed but straight, and armed with many teeth on each side, and the last ring of the thorax not movable but soldered to the preceding one. The COMMON LOBSTER (*H. vulgaris*), found in great plenty on rocky coasts of Britain and most parts of Europe, is too well known to require description. It sometimes attains such a size as to weigh 12 or 14 lbs. when loaded with spawn, although a lobster of 1 lb. weight, or even less, is deemed very fit for the market. It is needless to say how highly the lobster is esteemed for the table. It is in best season from Oct. to the beginning of May. Its beautifully clouded and varied bluish-black color changes to a nearly uniform red in boiling. It is found in greatest abundance in clear water of no great depth, and displays great activity in retreating from danger, using its powerful tail-fin for swimming, or almost springing through the water and thrusting itself into holes of the rocks which seem almost too small to admit its body. The claws are powerful weapons of defense; one is always larger than the other, and the pincers of one claw are knobbed on the inner edge, those of the other are serrated. It is more dangerous to be seized by the serrated than by the knobbed claw. Lobsters are sometimes caught by the hand, which requires dexterity; but they are more frequently taken in traps of various kinds, sometimes made of osier twigs, sometimes a kind of nets, sometimes pots, but always baited with animal garbage. The supply of lobsters sent to market, chiefly to London, from the coasts of all parts of Britain has of late years greatly fallen off from over-fishing. Lobsters are very voracious; they are also very pugnacious, and have frequent combats among themselves, in which limbs are often lost; but the loss is soon repaired by the growth of a new limb, rather smaller than the old one. Like crabs, they frequently change their shelly covering, and for a short time before their molting are very languid and inert. Their growth takes place during the time when the shell is soft, and with extraordinary rapidity.—The AMERICAN LOBSTER (*H. Americanus*) has claws much larger in proportion than the common lobster.—The NORWAY LOBSTER (*nephrops Norvegicus*) is frequently taken on the British coasts, and appears in the markets. The eyes are kidney-shaped, and not round as in the common lobster. The claws have also a more slender and prismatic form, and the color is a pale flesh-color. It is said by some to be the most delicate of all the crustaceans; by others, to be inferior to the common lobster.—The SPINY LOBSTER, or SEA CRAYFISH (*palinurus vulgaris*), is not uncommon on the rocky coasts of Britain, particularly in the south. It is believed to be the *karabos* of the Greeks and the *locusta* of the Romans. It attains a length of about 18 inches. The shell is very hard, and the whole body is rough with short spines. The antennæ are very long, much longer than those of the common lobster. There are no claws or pincers, the first pair of feet being very similar to the others. The spiny lobster is brought to market in London and elsewhere, but is inferior to the common lobster.—Other species of these genera are found in other parts of the world.

LOBSTER (*ante*). A mere inspection will show that a lobster is composed of two principal parts. These are commonly called the head and the tail. That which is called the head is really the head and the thorax combined, and is technically called the cephalothorax; while the part called the tail is the abdomen. Like all annulosa (articulata), the lobster is composed of a number of annular segments, or parts representing such, with members—legs, jaws, claws, feelers, etc.—attached to them, the whole being inclosed in a chituous shell. See CHITIN, *ante*. These segments may be separated one by one, with the members attached to them, and examined. Each segment is composed of a convex upper plate called the tergum, and closed beneath by a flatter plate called the sternum, while the side of the segment is called the pleuron. These segments are

again subdivided into parts which are amalgamated, but it is sufficient for the purposes of this article to give only a general description. There are 21 segments in the whole body, 7 in the head, 7 in the thorax, and 7 in the abdomen. The cephalothorax, or the part called the head, is covered with a shield or carapace, sometimes called the cephalic buckler, composed of an enormous development of tergal or dorsal pieces. The first segment of the head is provided with long, movable eye-stalks or peduncles, bearing upon their ends the compound eyes. The next six segments of the head, from before backwards, are furnished with: first, the antennules or smaller antennæ, each composed of a basilar piece called a protopodite, and two somewhat elongated feelers or antennæ; next, the larger antennæ, each composed of a protopodite, and a single, greatly elongated feeler; next, the biting jaws or mandibles, between which is the aperture of the mouth, bounded behind by a forked process called the labium, and in front by a broad plate called the labrum or upper lip. The next two segments after this are provided with appendages called, respectively, the first and second pairs of maxillæ, each situated upon a protopodite, with terminal joints, which in the first pair are rudimentary, but in the second are provided with spoon-shaped joints, called scaphognathites, whose office is to cause a current of water to pass through the gill-chamber by constantly bailing water out of it. The next and last segment of the head (according to Huxley this belongs to the thorax) bears one of the three pairs of modified limbs, called maxillipedes, or foot-jaws. These are legs with the ordinary structure of a protopodite, and three other joints added, called exopodite, endopodite, and epipodite. These limbs are modified so as to aid the purposes of mastication. This description applies to the next two pairs of segments, and which belong to the thorax, according to the usual division. The third pair of appendages of the thorax (the fourth according to Huxley) are the great claws, or chelæ. The next two pairs of thoracic limbs are also provided with nippers or chelæ, but they are much smaller. The last two pairs are similar, except that they are terminated by simple, pointed joints, and not chelæ. These last two pairs, however, differ, in that the next last pair has attached to its protopodite a process which serves to keep the gills apart. Of the segments of the abdomen, seven in number, five—all except the first and last—are provided with appendages called swimmerets. Each swimmeret consists of a basal joint and two diverging joints. The basal joint is the protopodite, the outer of the diverging joints the exopodite, and the inner one the endopodite. In next to the last segment (the last one which has appendages), the swimmerets are greatly expanded, so as to form powerful paddles. The last segment of the abdomen is called the telson; it has no appendages, and for this reason some authorities do not regard it as a segment, but as an azygos appendage, or, in other words, an appendage without a fellow. The first segment of the abdomen will be seen to be considerably modified from those bearing swimmerets.—An esophagus leads from the mouth into a globular-shaped stomach, containing a calcareous apparatus for grinding food. This kind of mill is called the *lady in the lobster*. The intestine passes without convolutions in a nearly straight course to the anal aperture, which is situated on the under-side just in front of the telson. The lobster has a well developed liver, consisting of two lobes, which enter the intestine by separate ducts. The heart is a muscular sack situated in the back just beneath the carapace, and opens by valvular apertures into a surrounding venous sinus, called (improperly) the pericardium. The gills are pyramidal, lance-shaped bodies, situated immediately beneath the heart and attached to the bases of the legs. Each consists of a central stem supporting numerous laminæ, and they are unprovided with cilia. Water is propelled through them by the movements of the legs and by the spoon-shaped joint of the second pair of maxillæ above-mentioned, which is constantly in motion, bailing out water in front of the branchial chamber, thus allowing the entrance of fresh water through the posterior aperture. The nervous system is situated along the ventral surface of the body, and consists of a series of ganglia united by commissural cords. Two compound eyes, two pairs of antennæ or feelers, and two ears in the form of sacks comprise the special organs of sense. The arrangement of the muscular system is in general like that of all articulates.

LOB-WORM, a species of dorsibranchiate annelid belonging to the genus *arenicola*, order *errantia*. It has the specific name *a piscatorium* from being used by fishermen for bait. It lives in deep canals, which it hollows out of the sand on the sea-shore, eating its way and passing the sand through the alimentary canal to extract whatever nutriment it may contain. It has a large head without eyes or jaws, and a short proboscis, and 13 pairs of gills, placed on each side of the middle of the body. See INVERTEBRATE ANIMALS.

LOCAL PREACHERS. An order of lay preachers in the Methodist churches, their name distinguishing them from the itinerant or traveling preachers. They are not, as the regular preachers are, members of annual conferences, nor are they, like them, appointed by the bishops or stationing committees. They are licensed, and are subjected to the direction of the pastor or presiding elder in whose charge they reside. Sometimes a local preacher, by special arrangement and by the authority of the presiding elder, is appointed a pastor for a specified period. For appointment as a local preacher a person must be recommended by the leader's meeting of the church to which he belongs, and must be elected by a quarterly conference before which he has been exam-

ined as to doctrines and discipline. As proof of his appointment he receives a license signed by the president of the conference, which is for one year only, and must be renewed every year afterwards. For ordination, a local preacher must have held a local preacher's license for four consecutive years, must have been examined in the quarterly conference on doctrines and discipline, must have received a "testimonial" from the quarterly conference signed by the president and secretary, and must pass an examination as to character and attainments before the annual conference.

The office of local preacher was instituted by Wesley. These preachers are laymen who support themselves by their secular business during the week, and preach on the Lord's day, mostly in poor or new churches, receiving, with rare exceptions, no fee or reward for their services. Their number in the United States in all the Methodist bodies is about 22,000. A national local preachers' association has been formed, which meets annually for counsel and the discussion of questions pertaining to their work. Branch associations have been formed in various parts of the United States. In England a *Local Preachers' Magazine* is published.

LOCARNO. See LAGO MAGGIORE.

LOCHABER AXE, an axe with a curved handle and very broad blade. It was the ancient weapon of the highlanders, and was carried by the old city guard of Edinburgh.

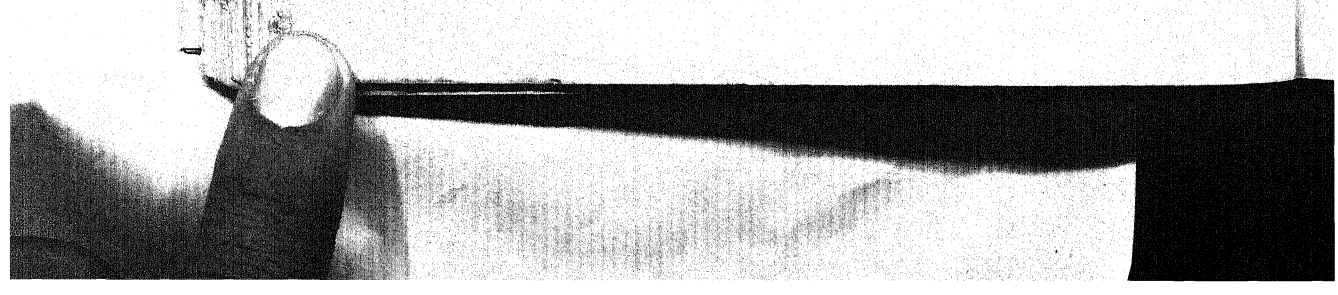
LOCHES, a picturesque t. of France, in the department of Indre-et-Loire, on the left bank of the Indre, 25 m. s.e. of Tours. Pop. '76, 3,689. The castle of Loches (now a ruin) acquired a fearful reputation during the reign of Louis XI. as the scene of those deeds of cruelty which were so horrible that they had to be done in utter darkness and secrecy. At a later period, James V. of Scotland was married in this castle to Magdalen of France; and still later, Francis I. received here, in splendid state, the emperor Charles V. on his way from Spain to Ghent.

LOCHRANE, OSBORNE A., b. Middletown, Armagh, Ireland, 1829. Before completing his education he had indulged in such violent denunciations of the British government that his father, in order to place him beyond the reach of prosecution, sent him to New York, where he arrived Dec. 21, 1846. He soon afterwards went to Georgia, where his fluency as a public speaker attracted the attention of an eminent citizen, by whose advice he studied law. Having been admitted to the bar in 1849 he opened an office in Savannah, but soon removed to Macon, where, from 1861 to 1865, he was judge of the circuit court. In the latter year he removed to Atlanta, and in 1870 was made judge of that circuit. In 1871 he was appointed chief-justice of the state supreme court, but resigned at the end of that year to resume practice at the bar.

LOCK of a gun is that apparatus by which the powder is fired. Muskets, in their earliest use, were fired by the hand applying a slow match to the touch-hole. Towards the end of the 14th c., the first improvement appeared in the *matchlock.* This consisted of a crooked iron lever, in the end of which the match was fixed. By a pin-gear of a simple nature, pressure on the trigger brought the match accurately down on the powder pan, of which the lid had previously been thrown forward by the hand. This mode of firing involved the carrying of several yards of slow match, usually wound round the body and the piece; rain extinguished the match, and wind dispersed the powder in the pan, so that the matchlock, clumsy withal, was but an uncertain apparatus.

Superior to the matchlock was the *wheel-lock,* introduced at Nuremberg in 1517, in which fire was produced by friction between a piece of flint or iron pyrites and a toothed wheel. The mechanism which generated the sparks simultaneously uncovered the pan, so that the dangers from wind and rain were averted; but, before firing, the apparatus required to be wound up like a clock, and therefore the charges could not be frequent. The wheel-lock continued for a long period to be used in Germany, and partially in France. In the Spanish dominions, however, its place was supplied by the simpler contrivance called the Snaphaunce, Snapphahn, or Asnaphan lock, of nearly contemporaneous invention, which, acting by means of a spring outside the lock-plate, produced fire through the concussion of a flint against the ribbed top of the powder-pan. Its positions of half and full cock were obtained by the insertion of a pin to stay the operation of the main-spring. In the middle of the 17th c. the *flint-lock* was invented, combining the action of the wheel-lock and the snaphaunce, while it was incontestably superior to either. After combating much prejudice, it was universally adopted in the armies of western Europe by the commencement of the 18th century. Muskets embracing it obtained the name of "fusils," a French adaptation of the Italian word *focile,* a flint. With successive improvements, the flint-lock continued in general use until the introduction of the *percussion-lock* almost in our own day; and among eastern and barbaric nations the flint-lock is still extant. Its great superiority over the snaphaunce consisted in the "tumbler" (of which presently) and the "scear," appliances still retained in the percussion-lock, which enabled the positions of half and full cock to be taken up without the intervention of pins, always uncertain in their action.

The principle of the percussion-lock is the production of fire by the falling of a hammer upon detonating powder, the explosion of which penetrates to the charge in the barrel of the gun. The first practical application of this principle to fire-arms is due to the rev. Mr. Forsyth of Belhelvie, in Aberdeenshire. Various forms in which to ignite the detonating powder have been devised, but that generally accepted until within the



last few years was the copper-cap, fitting tightly on the nipple of the gun, charged with a detonating compound, and exploded by the hammer falling upon it. The main-spring communicates through the swivel with the tumbler, which concentrically with the hammer moves on the tumbler-nail. After the hammer has delivered its stroke, its further progress in the direction required by the spring is barred by the nipple. On pulling back the hammer to the position of half-cock the tumbler turns with it, and the pointed end of the scear (which moves on the scear-nail as center), influenced by the scear-spring falls into a notch in the tumbler. On forcing back the hammer to full-cock, however, the scear will move down to a shallower notch; and on the lever end of the scear being raised by the trigger, it brings down the hammer with a heavy blow on the cap. To keep the works firmly in their several places, a "bridle" is screwed over them which includes the pin through the tumbler in its width.

Since the adoption of breech-loading arms, the action of the lock is so far varied that the hammer usually falls on a movable pin, which is impelled against a detonating charge placed in the body of the cartridge itself. A spiral spring around the pin brings it back to the position necessary for another blow. The advantage of this arrangement is that one operation of loading is substituted for the double process of loading and capping.

LOCK, on a river or canal, is an arrangement of two parallel floodgates, by which communication is secured between two reaches of different levels. When locks were first introduced, is not known within a hundred years, nor is it clear whether Holland or Italy can claim the distinction of having first employed them. This much, however, can be affirmed with certainty, that at the beginning of the 17th c. locks existed in both countries, and it is probable that they were arrived at gradually by successive improvements in the mode of rendering shallow rivers navigable. Obviously, the first step would have been to dam the stream across at intervals, leaving gates in the dams for the passage of vessels. This measure would have divided the river into reaches or steps, each, as the source was approached, being higher above the sea than the one last passed. But the passage up or down—and especially up—such a stream must be extremely slow, as at each dam a vessel must wait until the gate has been opened, and the level equalized in the reach it is in, and that on which it is proposed to enter. Where the reaches were far apart, a large body of water would require to be raised or lowered, and the process could not but be tedious. The mediæval engineers next tried to place the dams as near together as possible, but expense limited this. The course then was to build two dams, with floodgates, just far enough apart to allow a vessel to float within. Under this arrangement, only the section between the dams had to be raised or lowered. The cost of thus doubly damming a wide river, however, was very great, and it was an easy transition of idea to remove the passage from the main stream altogether and construct a *lock* with double gates which should open at one end above and at the other below the dam or weir. The economy of money in building, and of time and water in working, was obvious; and on this principle all locks are now made, wherever there is traffic of any importance. The arrangement consists of two pairs of gates, opening up the stream, and offering, when shut, a salient angle to the stream or upper pressure. The effect is that the weight above only tends to close the gates still tighter. When a vessel is to be brought from one level to the other, it is floated into the "pound," as the space between the upper and lower gates is called. The gates are then shut, and a sluice in the lower part of the upper gate raises the surface of the pound, or the sluice in the lower gate depresses it in a few minutes to the level of the upper or lower reach, as the case may be. These sluices are worked by racks in the gates, and the ponderous gates themselves are moved with the aid of long and heavy levers. Of course, one pair of gates must always be shut, or the two reaches would speedily assimilate their levels.

On canals where water is scarce, a reservoir, equal in size to the lock, is formed at its side. When the pound is to be emptied, the water is run into the reservoir until it and the lock are at the same level, which will be half height. The reservoir is then closed, and the remaining water in the lock run off through the lower sluices in the usual way. On refilling the lock, before opening the upper sluices, one-quarter the quantity required can be obtained from the reservoir, thus effecting a saving of many tons of water at each filling.

On rivers advantage is taken of islands for the formation of weirs (q.v.) and locks. On the Thames the locks are from 2 to 3 m. apart, and the river is locked by upwards of 50 locks from Teddington to Lechlade. On canals, to economize superintendence, the locks are usually constructed in "ladders" of several close together, like a flight of steps. As the pressure on lock-gates is very great, and varies with the height of water above, the rise in one lock is rarely more than 8 or 9 ft., although in some instances 12 ft. have been accomplished, and in a very few cases even more.

LOCK, a contrivance for securely fastening the door of a building, the lid of a box, etc. Amongst the early Egyptians, Greeks, and Romans, locks were used, but their construction evinced little skill, and they were usually made of hard wood; in fact, they were little more than wooden bolts, requiring only the hand to unfasten them. The first advance upon this was a remarkable one, invented by the ancient Egyptians; it contained the principles of the modern tumbler-lock; but although still in use amongst

the modern Egyptians and Turks, it has never, in their hands, made any advance. This lock consists of a case, which is nailed to the door; through the case passes a large wooden bolt, the end of which enters the staple, whilst the opposite end is left exposed. In the lower part of the bolt is a square groove, which has certain round or square holes. When the bolt is pushed home into the staple, these holes come exactly under corresponding little cavities in the case, in each of which is placed an upright wooden pin with a knob, which prevents its falling too low: these little pins consequently fall into the holes in the bolt when it is pushed far enough, and the door is locked. In order to unlock it, a bar of wood is passed into the groove in the bolt, and on the bar there are the same number of pins of wood placed upright as there are holes in the bolt and loose pins in the chambers of the case; and these upright pins are placed so as to correspond exactly in size and position to the holes; therefore, when the pins reach the holes, they slip into them and push up the loose pins into their respective cavities, and the bolt is then easily pulled back by means of the bar or key. This is simple and ingenious, but it is very clumsy, and, as usually made in Turkey, is not secure. Nevertheless, it has been in use longer than any other form of lock in existence.

During the middle ages, very complicated and ingenious locks of various kinds were made, and as much artistic taste was expended upon the ornamentation of their external metal work as there was skill in the interior mechanism. Such locks, however, were not adapted to general use, and they were only found on the caskets of the wealthy. The ordinary ward and spring locks were the only ones commonly employed up to the beginning of the present century, even for important purposes, and this kind of lock is still in very common use. It consists of a bolt of metal, to which a spring is attached, and it is moved backward or forward by means of a key, which by raising the bolt compresses the spring in the slot, through which it works, and so lets it pass on until out of the range of the key's action, which turning on a pivot is regulated by the length of its wards and the depth of a curve cut in the under side of the bolt. In order to prevent any key of the same size opening all such locks, little ridges of iron are placed in circles or parts of circles, and wards are cut in the keys so as to correspond with them; hence, only the key which has openings or wards which will allow the ridges to pass through them can be used. The bolt has at the end opposite to that which enters the staple a small piece slit, bent outwards, and tempered hard; this forms the spring; below are two notches, divided by a curved piece of the bolt; there is another notch, which if the key enters and is turned round it draws the bolt forward or backward in locking or unlocking, and the spring makes the end of the bolt either drop into one of the notches or rise up the curve, according to the distance to which it is pulled. The ridges are so placed as to allow the wards of the key to move freely, and to prevent the entrance of another key of different arrangement.

The *tumbler-lock* is the type of another class, and is an advance upon the last; the two principles are, however, in most cases combined. The principle of the tumbler-lock will be readily understood by a lock nearly like the former, to which a description of the simplest form of *tumbler* has been added. The bolt has neither the string-piece nor the notches and curves on the under side, but it has two notches on the upper side, which are exactly as far apart as the distance moved by the bolt in locking or unlocking. Behind the bolt is the tumbler, a small plate moving on a pivot, and having projecting from its face a small square pin, which when the bolt is locked or unlocked falls exactly into one or the other of the small notches. There is in the key a notch which corresponds to the outline of the tumbler. This acts upon the tumbler when the key is turned, and raises it so as to lift the pin out of the notch in the bolt, and allow the latter to be moved freely forward until the other notch comes under the pin, when the latter falls into and immediately stops its further progress, and the action of the key must be reversed in order to relieve it again. This very simple application of the tumbler is sufficient to explain the principle which may be and is varied to an almost endless extent. Chubb's justly celebrated lock carries it out most fully, the bolt itself being only a series of tumblers, with a notch on the key for each. Bramah's lock, patented in 1788, has enjoyed immense reputation, chiefly for cabinets, desks, and other similar applications; it is very different in principle from those before-mentioned, consisting of a number of movable slides or interior bolts working in an internal cylinder of the lock, and regulated by the pressure upward or downward of the key acting on a spiral spring. For ordinary purposes it is very secure; but when the most perfect security is required, the beautiful lock invented by Mr. Cotterill of Birmingham, and the still more ingenious one of Mr. Hobbs of America, must be preferred. These beautiful and complicated pieces of mechanism cannot be described within the limits of this article; but ample information upon them and others can be found in Mr. Denison's *Treatise on Locks*, and in *The Rudimentary Treatise on the Construction of Locks*, by Charles Tomlinson.

LOCK (*ante*). An important class of locks are what are called permutation and dial locks, and are used upon burglar-proof safes. One of the principal devices in them is the employment of a number of wheels, placed near together, on an axis on which they move independently. These wheels do not interfere with the motion of each other except when certain pins are brought in contact, the pins being movable at the will of

the person adjusting the lock. In this way one having knowledge of the combination may arrange the wheels so that certain slots in their peripheries will not coincide, and cannot be made to coincide, by any one not in possession of the arrangement. The person having such knowledge may, however, readily place the slots into line and pass a key through them, by which means alone the bolt of the lock is moved. An ingeniously arranged dial is placed on the outside of the safe door, through which a bolt passes attached in the lock to a wheel. This fixed wheel can be turned one way or another, and, being provided with a pin, the first of the movable wheels may be turned so that its slot will correspond to any number on the dial. This first movable wheel, being also provided with a pin upon its disk, is made to turn the second wheel to a certain position, and so on to the last wheel, when, the slots being all brought into line, the key is introduced. There are a great many varieties of these locks, each possessing various advantages. As burglars often compel the person having the knowledge of the combination of a lock to reveal the secret, it is often the practice to employ for bank-vaults locks with a clock-work attachment by means of which the bolt is liberated at a certain hour, until which time, nobody, not even the person possessing a knowledge of the combination, can open the lock.

LOCK, or GOWPEN, in Scotch law, is the perquisite paid by custom to the miller's man for grinding corn. See THIRLAGE.

LOCK, MATTHEW, 1635–77; b. Exeter, Eng.; received instruction in the rudiments of music from Wake, organist of Exeter cathedral, and completed his studies under Edward Gibbons. When Charles II. made his entry into London after the restoration, Lock was employed to write the music for the occasion, and was afterwards appointed composer for the king. The first piece that bore his name was *A Little Consort of Three Parts*, for viols and violins. He was the first musician of England who composed music for the stage; and he wrote the instrumental music in the *Tempest* and *Macbeth*. In 1675 he composed the overture and airs to Shadwell's *Psyche*. He wrote several sacred pieces found in the *Harmonia Sacra*, and in Boyce's *Collection of Cathedral Music*, which show him a master of harmony; but his fame rests chiefly on his music in *Macbeth*, which his biographer says is "a lasting monument of the author's creative power and judgment." He wrote also some controversial musical treatises. A few years before his death he became a Roman Catholic.

LOCKE, JOHN, was b. at Wrington, near Bristol, on Aug. 29, 1632. His father was steward to col. Popham, and served under him as capt. in the parliamentary army during the civil war. Locke was sent for his education to Westminster school, where he continued till 1651, when he was elected a student of Christ church, Oxford. There he went through the usual studies, but seemed to prefer Bacon and Descartes to Aristotle. His tendency was towards experimental philosophy, and he chose medicine for his profession. In 1664 he went to Berlin as secretary to the British envoy, but soon returned to his studies at Oxford. In 1666 he made the acquaintance of lord Ashley, afterwards earl of Shaftesbury, and on his invitation went to live at his house. In 1672, when Shaftesbury became lord chancellor, Locke was appointed secretary of presentations, a post which he afterwards exchanged for that of secretary to the board of trade. He was employed to draw up a constitution for the American province of Carolina, but his articles on religion were deemed too liberal, and the clergy got a clause inserted, giving the favor of the state exclusively to the established church. In 1675 he took up his residence at Montpellier for the benefit of his health. He had all his life an asthmatic tendency, which at that time threatened to pass into consumption. At Montpellier, he formed the acquaintance of the earl of Pembroke, to whom his *Essay* is dedicated. In 1679 he rejoined the earl of Shaftesbury in England; but in 1682 the earl fled to Holland, to avoid a prosecution for high treason. Locke bore him company, and so far shared with him the hostility of the government of James as to have his name erased, by royal mandate, from the list of students of Christ church. Even in Holland he was demanded of the states-general by the English envoy; but he contrived to conceal himself till the English court ceased to trouble itself on his account. In 1687 his *Essay on the Understanding*, begun 17 years before, was finished; and an abridgment of it was published in French (1688) by his friend, Le Clerc, in his *Bibliothèques*, in which Locke had published two years before his *Method of a Commonplace Book*. In 1689 appeared (also in Holland) his first letter on *Toleration*. But in 1688, the year of the revolution, he came back to England in the fleet that conveyed the princess of Orange. He soon obtained from the new government the situation of commissioner of appeals, worth £200 a year. He took a lively interest in the cause of toleration, and in maintaining the principles of the revolution. In 1690 his *Essay on the Understanding* was published, and met with a rapid and extensive celebrity; and also a second letter on *Toleration*, and his well known *Treatises on Government*. In 1691 he was engaged upon the momentous question of the restoration of the coinage, and published various tracts on the subject. In 1692 he brought out a third letter on *Toleration*, which, as well as the second, was a reply to the attacks made on the first. In 1693 was published his work on *Education*. In 1695 king William appointed him a commissioner of trade and plantations. In the same year he published his treatise on *The Reasonableness of Christianity*, which was written to promote William's favorite scheme of a comprehension of all the Christian

sects in one national church. He maintained a controversy in defense of this book; he had another controversy in defense of the *Essay on the Understanding*, against Stillingfleet, the bishop of Worcester. His feeble health now compelled him to resign his office of commissioner of plantations, and to quit London; and he spent the remainder of his life at Oates, in Essex, at the seat of sir Francis Masham. His last years were very much occupied with the study of the Scriptures, on which he wrote several dissertations, which, with his little work, entitled *On the Conduct of the Understanding*, were published after his death. He died Oct. 28, 1704.

Great as was Locke's services to his country, and to the cause of civil and religious liberty, his fame rests on the *Essay on the Understanding*, which marks an epoch in the history of philosophy. His purpose was to inquire into the powers of the human understanding, with a view to find out what things it was fitted to grapple with, and where it must fail, so as to make the mind of man "more cautious in meddling with things exceeding its comprehension, and disposed to stop when it is at the utmost extent of its tether." This purpose led him to that thorough investigation of the constitution of the human mind, resulting in the most numerous and important contributions ever made by one man to our knowledge on this subject. He institutes a preliminary inquiry, in the subject of the first book, as to the existence of innate ideas, theoretical and practical, on which the philosophical world has been so much divided. See COMMON SENSE. Locke argues against the existence of these supposed innate conceptions, or intuitions, of the mind with a force and cogency that appear irresistible. Having thus repudiated the instinctive sources of our knowledge or ideas, he is bound to show how we come by them in the course of our experience. Our experience being twofold, external and internal, we have two classes of ideas—those of sensation and those of reflection. He has therefore to trace all the recognized conceptions of the mind to one or other of these sources. Many of our notions are obviously derived from experience, as colors, sounds, etc.; but some have been disputed, more especially such as space, time, infinity, power, substance, cause, mere good and evil; and Locke discusses these at length, by way of tracing them to the same origin. This is the subject of book second, entitled "Of Ideas." Book third is on language considered as an instrument of truth, and contains much valuable material. The fourth book is on the nature, limits, and reality of our knowledge, including the nature of demonstrative truth, the existence of a God, the provinces of faith and reason, and the nature of error.

LOCKE, DAVID ROSS, more widely known by his *nom de plume* of Petroleum V. Nasby; b. Vestal, Broome co., N. Y., 1833. He became a printer in the office of the *Cortland Democrat*, and subsequently publisher and editor of the *Plymouth Advertiser*, the *Mansfield Herald*, the *Bucyrus Journal*, the *Findlay Jeffersonian*, and the *Toledo Blade*, all in Ohio. In 1860 he began the publication of the Nasby letters in the *Findlay Jeffersonian*, and soon after continued them in the *Toledo Blade*. They were designed to throw ridicule on the flimsy logic then in vogue to bolster or shield the institution of slavery. The keenness and pungency of the satires were instantly recognized wherever read. They soon gained wide circulation, and became a powerful auxiliary to the administration of Lincoln in aiding to paralyze the efforts of northern sympathizers with the southern cause. In 1866, when president Johnson was seeking popular support for his policy by traveling in the west with his cabinet, Locke, under the same *nom de plume*, made the expression of "swinging round the circle" as ridiculous and notorious as possible, by grotesquely journalizing the daily doings of the cortege. As an editor Mr. Locke is remarkable for terse and vigorous thought and diction; and whether humorous or serious is always a trenchant writer. It is his misfortune, however, to have courted popularity among men of low tastes, and the tendency of his writings has been of late to a lower grade of subjects. In 1875 he published *The Morals of Abou Ben Adhem;* and in 1879 a coarse comic drama entitled the *Widow Bedott*, simply an adaptation of the comic story of that name written by Mr. Frances M. Whitche in 1854, and of no credit to Mr. Locke in conception or adaptation, though it has proved popular with a certain grade of theater-goers. Mr. Locke is still publisher and editor of the *Toledo Blade*.

LOCKED-JAW. See TETANUS.

LOCKHART, JOHN GIBSON, was b. at Cambusnethan, in Scotland, in 1794. His father was a minister of the established church of Scotland. Lockhart received the first stages of his education at Glasgow, and afterwards proceeded to Oxford, where, in 1813, he took first-class honors. In 1816 he became an advocate at the Scotch bar. He appears, however, to have wanted the qualifications necessary for success in this profession, and besides the bent of his mind was more toward literature than law. He and Wilson were long the chief supporters of *Blackwood's Magazine*. Here he began to exhibit that sharp and bitter wit that was his most salient characteristic and made him the terror of his enemies. It was this connection which led to his acquaintance with sir Walter Scott. In 1819 appeared *Peter's Letters to his Kinsfolk*. In 1820 he married Miss Scott, eldest daughter of sir Walter. In 1821 he published *Valerius*, and in 1823 *Adam Blair*. Both of these works, especially the latter, show him to have possessed, at least, a thorough acquaintance with the rules of art in fiction-writing. In 1823 appeared his *Reginald Dalton*, a tale of English university life, and in 1824 his *Ancient Spanish Ballads*, perhaps the most popular of all his writings. In the same year he published his last

novel, *History of Matthew Wald.* From 1826 to 1853 he edited the *Quarterly Review.* From 1837 to 1839 appeared his *Life of Scott,* a work of undoubted merit, but which has given rise to much bitter controversy. In 1837 his wife died, having been predeceased by their eldest son, Hugh. His second son died at a later period. In 1843 Lockhart was appointed auditor of the duchy of Cornwall, with a salary of £600 a year. In 1847 his only remaining child, a daughter, the sole surviving descendant of sir Walter Scott, married J. R. Hope, Esq. She died in 1858, leaving an only daughter, who inherited the estate of Abbotsford. Lockhart died Nov. 25, 1854.

LOCK HAVEN, a city in Pennsylvania, capital of Clinton co., on the s. bank of the w. branch of the Susquehanna river, at the mouth of Bald Eagle creek, and on the w. branch canal and the Philadelphia and Erie and the Bald Eagle division of the Pennsylvania railroad; 70 m. n.n.w. of Harrisburg; pop. '70, 6,986. It is the center of an extensive lumber trade, contains 13 churches, 2 national banks, 3 weekly newspapers, and graded public schools.

LOCK'PORT, a city of New York, U. S., on the Erie canal and the Rochester and Niagara Falls railway, 55 m. w. of Rochester. The canal here falls 60 ft., with 5 combined double locks, and its surplus water gives power to 5 flouring-mills, 7 saw-mills, 5 stave and shingle factories, machine-shops, and foundries. There are 13 churches, 4 banks, 2 daily and 3 weekly newspapers, and tanneries, manufactories of agricultural implements, glass, etc. Pop. '75, 12,624.

LOCKPORT (*ante*) was incorporated as a city in 1865. The railroad crosses the canal by a bridge 500 ft. long and 60 ft. above the water; the surplus water of the Erie canal, after being raised 60 ft. by 5 double combined locks, is distributed through a hydraulic canal three-fourths of a mile long to the various manufactories of the city. This immense water-power is the chief source of the city's prosperity, affording as it does almost unexampled facilities for manufactures of every kind.

LOCKROY, JOSEPH PHILIPPE, a French dramatist, b. Turin, 1803. His true name is SIMON. He excelled as an actor of the *Comédie Française,* but left the stage and devoted himself to writing for it with Scribe, Anicet-Bourgeois, and others. His most popular plays are *Passé Minuit; Les Trois Épiciers; Le Chevalier du Guet;* and *Charlot et le Maître d'École.* He wrote in connection with Alexander Dumas a drama entitled *Conscience.* He wrote also the librettos for *La Reine Topaze,* and other operas.

LOCK-UP HOUSES, the name given to the houses of bailiffs of the sheriff, to which debtors arrested for debt are first taken, until it is seen whether they will settle their debt without being taken to the ordinary jail. See EXECUTION; IMPRISONMENT.

LOCKYER, JOSEPH NORMAN, b. Eng., 1836; received his education at private schools in England and on the continent. In 1857 he was appointed to a position in the war-office, and in 1865 became editor of *Army Regulations.* He was appointed in 1870 secretary of the royal commission on scientific instruction and the advancement of science, from which he was afterwards transferred to the science and art department of the same organization. He is best known for his services in astronomy and physics: he discovered a method of observing sun phenomena, in commemoration of which the French government caused a medal to be struck in 1872. He has held the position of chief of several government expeditions for astronomical observation. In 1874 he received the Rumford medal from the royal society. He has published *Contributions to Solar Physics,* 1873; *The Spectroscope and its Applications,* 1873; *Star Gazing, Past and Present,* 1878; and other works.

LO'CLE, a frontier t. of Switzerland, canton of Neuchâtel, and 10 m. n.w. of the town of that name. Pop. '70, 10,334, who are engaged chiefly in watch-making. Upwards of 80,000 watches are annually manufactured.

LOCO, in music, indicates that the notes are to be played exactly as they are written.

LOCOMOTIVE, COMPRESSED AIR. The attention of engineers has for a few years past been directed to the construction of locomotives using compressed air instead of steam. Compressed air for driving stationary engines for rock-drilling in tunnels has been in use for some time, but in these the compressed air was directly furnished by a pump driven either by steam or water-power, the latter being preferred where convenient. At the present time the application of compressed air to locomotives is thought practical only for short lines and where steam is objectionable, but it is possible that in the future long lines of railway may be furnished with pneumatic pipes, or with pumping-stations, and receive their motor power in this manner. Compressed air street-motors have been used in Glasgow, Paris and New York; and two Scottish engineers, Robert Hardie and John James, have been and still are engaged in this country upon the problem. It is said that the pneumatic engines devised by them, which have been running at intervals on the Harlem portion of the Second avenue surface road, between 96th and 130th streets, have proved so satisfactory that no doubts are entertained by the pneumatic tramway company that before many years this mode of propelling passenger cars on comparatively short distances will be generally adopted. It is believed that the properties of atmospheric air have not been utilized to anything near their natural limits.

The first problem in compressed-air locomotion is to compress and store air in a resevoir of suitable dimensions to be carried on a street-motor or car. In order that such car may be driven several miles and make numerous stops, a considerable amount of energy must be stored at the commencement of the trip, unless pneumatic pipes be laid along the line. In any case a certain distance has to be run before the compressed air reservoir can be replenished. The reservoir of compressed air may, therefore, be compared to the fuel of a steam-engine, although the air derives its energy from the fuel which supplies the compressing steam-engine. This comparison may show the importance of furnishing the motor with a conveniently disposed air-chamber filled with highly compressed air, and also of maintaining an equable pressure upon the driving pistons, while the compressed air is constantly diminishing in tension by its escape in performing its work. It is said by engineers who have given practical attention to the subject that it will be desirable to use an initial pressure of about 500 lbs. to the sq.in., which is the equivalent of about 33 atmospheres. A pressure of 300 lbs. to the sq.in., or 20 atmospheres, has been found practicable, and most motors have hitherto been run with this pressure. Of course, the compression of the air converts a vast amount of latent into sensible heat. See HEAT, *ante; Latent Heat.* This energy is lost because there is no way to prevent the sensible heat from being conducted away or dispersed. If the air be introduced into the motor reservoirs in the heated and dry condition which it attains in the pump cylinder, it would not be fit to perform its duty in the driving cylinders of the motor. It would not, however, retain its expanded volume in the motor reservoir without being kept heated. Before entering these reservoirs it must be cooled, and it is not improbable that the heat with which it parts on cooling may be utilized in producing a part of the steam for the pumping engine. The methods of cooling are various; those employed in compressing-engines for furnishing air directly to stationary air-engines have the pump cylinder surrounded by a cold-water jacket, or have a circulation of cold water in the cylinder head, or have sprays of cold water forced into the pump cylinder. The air for a store cylinder from which motors take their compressed air may, however, be more conveniently cooled by passing it through a tank of cold water.

In using a pneumatic motor there are three different machines all receiving their energy from the boiler steam. 1. The engine which drives the compressing machine; 2. The compressing machine itself; and 3. The engine which drives the locomotive. It is estimated that the loss of power in all these amounts to about one-half of that contained in the steam boiler of the pumping engine. One of the earliest compressed air locomotives was devised by M. Ribourt, the engineer at St. Gothard (see TUNNEL), for hauling debris from the tunnel. M. Ribourt's method for equalizing the pressure upon the driving pistons was the employment of a sliding cylinder inside of and concentric with the cylinder in which the driving piston moves. This inside cylinder is controlled by a spiral spring which is connected with the piston rod. Compressed air at the initial pressure enters the cylinder between the piston heads. Within this space it therefore has no effect, but it passes from this chamber through orifices into an outer jacket, and thence again on the further side of one of the piston heads, that one opposite the end to which the spring is applied. These orifices pass through both inside and outside cylinders, and their capacity depends upon the relative positions of the two cylinders. The adjustments of the different parts of the apparatus are so made that, when the air passes through the jacket to the outer surface of the piston head upon which it acts at its initial pressure the orifices in the cylinders do not exactly coincide, and their capacity is therefore diminished. As, however, the tension of the air diminishes, the spiral spring, acting against the pneumatic pressure, forces the inside cylinder farther back, at the same time increasing the capacity of the openings in the two cylinders by making them more nearly coincide. This increase of capacity of orifice is in the inverse ratio to the pressure, and the action is reciprocal and continuous. Considerable modifications have been made in motors running upon tramways in Glasgow, Paris, and New York. M. Mekarski has successfully propelled motors in France with compressed air at 450 lbs. per sq.in., or 30 atmospheres. The ordinary high-pressure locomotive engine is the form used, but the compressed air before reaching the cylinders is forced through a tank of hot water at about 220° F., by which means it becomes saturated with steam. An equalizing throttle-valve is placed on the top of the hot-water reservoir, for the purpose of regulating the pressure upon the pistons. Two of the locomotives were exhibited at the Paris exposition of 1878, one a car motor, the other a separate motor. The latter could draw a car containing 30 passengers from 10 to 11 m. on a level, and could ascend a grade of 5 to 100. Further improvements, it is said, have been introduced on motors which have been running on the Second avenue railroad in New York. One of the improvements is the passing of the compressed air through water heated to about 328°. It is claimed that the motors have worked successfully, and at a less cost than when horses are used for the same amount of work. Some engineers, however, do not accept these estimates, and it is declared that the experience at Glasgow, where both compressed air and steam motors have been used, indicates that the pneumatic motor requires more than four times the expenditure of steam to perform the same work that the steam motors do; and a leading French engineer says that at Paris it is estimated that the cost of motive power on street railways, calling horse-power 100, will be, for

compressed air, 64, and for steam power, 20, making compressed air a little more than three times as expensive as steam. It must, however, be understood that but a short time has elapsed since the first trials were made, and yet that considerable progress has been made—perhaps greater than has ever attended the development of any similar invention. A pamphlet issued by the pneumatic tramway engine company of New York contains a letter from gen. Herman Haupt, its consulting engineer, in which he says "that although one-half the power of the stationary engine is lost in compressing air, yet the economy of fuel can be made so great that a given amount of power in compressed air is secured at one-half the cost of the direct application of steam to motors." The difference in specific heat of water and of air also is important as regards the advantage in economy of air. See HEAT, *ante; Specific Heat.* Gen. Haupt again says: "By a simple device of heating the air by passing it through a tank of water it is claimed as the result of constant practice in Paris, confirmed by recent experiments on the Second avenue railroad, that the capacity for work is doubled, or the gain 100 per cent, making the economy of power, as compared with the direct application of steam to street motors, measured as it should be by the coal consumed, four to one in favor of compressed air." Again: "The motor cylinders are so arranged that in descending steep grades they act as air pumps, and at the same time as brakes, by which means it is found, as stated by the company's engineer, Mr. Hardie, that in running down grade on the Second avenue railroad, pumping back against a pressure of 200 lbs. in the receiver, the pressure was increased 7 lbs. in a distance of four-tenths of a mile."

LOCOMOTIVE ENGINE. See STEAM-CARRIAGE; STEAM-ENGINE, *ante.*

LO'CRI, or LOCRI EPIZEPHY'RII, a t. of the Greek Locrians in Italy, on the s.e. coast of the Bruttian peninsula. The name seems to indicate that it was a colony of a Locrian settlement at cape Zephyrium (capo di Bruzzano), on the Ionian sea. The date of its foundation is uncertain, some putting it B.C. 710, and others 683. The Locri Epizephyrii are said to have been the first Greek people who had a written code of laws. This code, drawn up by Zaleucus about B.C. 664, was so excellent that in the time of Demosthenes Locri is cited as an example of good government; and to the institutions of Zaleucus this city owed its prosperity and fame. In the battle at the river Sagras 10,000 Locrians defeated with great carnage 130,000 Crotoniats. After 205 B.C. Locri declined in importance, and after the 6th c. no author makes mention of it. Its site has been found about 5 m. from the modern Gerace, containing, among other remains, the fragments of a Doric edifice supposed to have been the temple of Proserpine. Several distinguished poets and philosophers were natives of Locri.

LO'CRIS—LOC'RIANS, an ancient Grecian race, in later times merged with the Achaians, deriving their name from Locrus, a king of the Leleges, from whom they descended. In historic times two distinct tribes were known. The eastern Locrians, divided into the Opuntii and Epicnemidii, dwelt opposite the island of Eubœa on the e. coast of Greece, and were said by Homer to be followers of Ajax son of Oileus to Troy. The western Locrians were called Ozolæ, and lived on the Corinthian gulf, w. of Phocis. From the first tribe were probably descended: 2. LOCRI EPIZEPHYRII, who not far from 700 B.C. founded a city in Magna Grecia on cape Zephyrium, now capo di Bruzzano. The Locrians were engaged in many wars with neighboring tribes, were held in subjection by the younger Dionysius after his banishment from Syracuse, B.C. 356, and during the wars of Rome with Pyrrhus and Carthage the city was alternately occupied by the opposing parties. The first code of written laws ever adopted by any people is said to have been that of Zaleucus, a Locrian king. Locris is said to have been destroyed by the Saracens as late as A.D. 600. In the existing century explorers have discovered ruins near the modern town of Gerace, thought to be those of a celebrated Locrian temple to Proserpine.

LOCUS, in geometry, denotes the line or surface traversed by a point which is constrained to move in accordance with certain determinate conditions. Thus, the locus of a point which must always preserve the same uniform distance from a fixed point is the surface of a sphere; but if the motion be at the same time confined to a plane, the locus in this case will be a circle: this is an illustration of the division into *solid* and *plane* loci which prevailed among the ancients. The Greek geometers made their geometrical analysis depend much upon the investigation of loci, but no specific records of their progress in this branch of geometry now exist. What would appear to have been their method was restored by Dr. Simson of Glasgow, whose work, *De Locis Planis* (1749), is a model of elegance. In modern geometry, plane loci are treated under the name of curves (q.v.).

LOCUS DELICTI, the place where a crime was committed, is a phrase used in criminal law.

LOCUS PŒNITENTIÆ, the time to withdraw from a bargain—a phrase often used in Scotch law. The general rule is that until the contract is finally settled either party may retract; but if *rei interventus* has intervened—i.e., if some act has been done by the other party on the faith of the agreement, and by which his position has been altered—the *locus pœnitentiæ* is barred. Much depends on the circumstances of each case as to the application of the rule.

LOCUST (*locusta* of some entomologists, and *acrydium* of others), the type of a family (*locustidæ* or *acrydidæ*) of the order *orthoptera* and section *saltatoria* (see GRYLLUS). Locusts differ from grasshoppers and crickets in their short antennæ and in the greater robustness of their bodies and limbs. The head is large, with two projecting oval compound eyes, and three stemmatic eyes on its summit. The wings when folded meet at an angle above the back; the abdomen is conical and compressed. Their hind-legs are large, and they possess a great power of leaping. They make a stridulant noise by the friction of the rough hind-legs against the wing-covers. The wing-covers are leathery, narrower than the wings, but equal to them in length; the wings are large, reticulated, fold like a fan, and are often beautifully colored—red, pink, brown, green, or blue. The power of flight of locusts has been the subject of much dispute, some asserting that they can fly to great distances, others that they have little power of flight and are merely carried before a gale of wind. The truth seems to be between these extreme opinions: locusts fly well, but they are sometimes wafted by winds where their power of flight would never have carried them. Their food consists of the leaves and green stalks of plants; the mandibles and maxillæ are strong, sharp, and toothed, and in eating they use their fore-feet to bring their food to their mouths. They generally quite consume any stalk of grass or other green thing which they have selected and cut. The terrible ravages of locusts are owing to the vast numbers in which they appear, filling the air like flakes of snow; darkening the sky, so that object casts no shadow; seeming, in the distance, like a thick smoke; advancing with a sound like the rushing of chariots or of waters, or, in the words of the prophet Joel, "like the noise of a flame of fire that devoureth the stubble;" whilst, as he also says, "the land is as the garden of Eden before them, and behind them a desolate wilderness." They eat up every green thing, and after the grass and leaves they devour in their hunger the bark of trees and shrubs. Ripe grain, however, may escape, as being too hard and dry. These multitudinous swarms of locusts do not appear annually; it is only after the lapse of a number of years that they are again so great and so destructive; and particular years are marked in the history of some countries as years of their extraordinary abundance, and of consequent famine and pestilence. When driven by a strong wind into the sea, they have sometimes been flung back on the beach in such quantities as to produce a stench intolerable to a great distance.

Locusts are found in almost all parts of the world except the coldest regions, but they abound chiefly in tropical and subtropical countries, and most of all in Arabia and Africa. The eastern and southern parts of Europe are occasionally visited by their destructive hosts, and in the s. of France rewards are paid for the collection of locusts and of their eggs. The eggs are found cemented together in little masses in the ground. The insects themselves are taken by means of a stout cloth, the edge of which is made to sweep over the surface of the ground, and the locusts thus thrown together are quickly gathered into sacks. A similar mode of diminishing the nuisance is adopted in North America; but before an invasion such as districts of Asia and Africa are occasionally subjected to all human effort fails.

Locusts are eaten in many countries, roasted or fried in butter. They are also preserved in brine or dried in the sun. They thus appear in the markets of Arabia, Syria, Egypt, Madagascar, etc., and are even exported as an article of commerce.

The most noted species is *locusta migratoria* (or *acrydium migratorium*) about 2½ in. in length, greenish, with brown wing-covers marked with black. It is this species which is most frequently seen in Europe. It is a rare visitant of Britain. Other species belong to other parts of the world. Some of them, forming the genus *truxalis*, and inhabiting the warmest countries, are remarkable for their elongated conical head.

The little chirping "grasshoppers" most common in Britain, differing from true grasshoppers in their short antennæ, belong to the genus *tetrix* and family *locustidæ*.

LOCUST (*ante*) and GRASSHOPPER (*ante*) are here considered together because of the confusion in the popular mind in regard to them. Their similarity in form and habits is considerable, and by some of the best authorities they are placed in one division under the name of grasshoppers, including two families, the acrididæ and locustidæ, the acrididæ forming the family of locusts, while the locustidæ form the family of grasshoppers. There has long been a popular error in regard to the identity of the locust, the idea having been very widely spread that a species of hemipterous insect, the seventeen-year cicada, allied to the dog-day harvest-fly, is the true locust. As classified by the U. S. entomological commission, probably the best authority for the general reader, the section of orthoptera called *saltatoria* is divided into three families, acrididæ, locustidæ, and gryllidæ, the latter family including the crickets. The acrididæ and locustidæ form a subsection or group called grasshoppers, for the insects comprising both these families are really grasshoppers, and the locust is quite as much of a grasshopper as any of the members of the other family; indeed, he may be regarded as the grasshopper *par excellence*. The principal distinctions between the two families are given in the article LOCUST, *ante*. See also CRICKET; GRASSHOPPER; CICADA, *ante*. Both the old-world and new-world locusts belong to the family acrididæ, but are in many cases of different genera, which, however, are said to shade off into one another, so that it is difficult to tell in which group to place some of the members. Most of the old-world

locusts belong to the genus *pachytylus*, the more devastating species being *P. migratorius*, but in south-western Europe the more common genus is *caloptenus*, the name of the Rocky-mountain genus; but the species is not the same. The locust of Algeria belongs to the genus *acrydium*, *A. peregrinum*. The old-world locusts are much larger than the Rocky-mountain locust, and probably a more formidable animal. More minute classifications are made, not needful here; as, for instance, the family acrididæ, containing as it does a very large number of species varying considerably in form and character, has been again divided into three subfamilies, *proscopinæ*, *acridinæ*, and *tettiginæ*, the acrididæ including the migratory locusts. The Alps form a dividing barrier or partition to the two different genera of European migratory locusts. There are many species of acrydium genera spread over the world, but as the most of them do not have the multiplying and migratory power of the few species which are among the world's historical scourges, they are not popularly known as locusts, but pass under the name of grasshopper: many of them may be seen in various localities, hopping along the fences, roadsides, mown meadows, and pastures, and can be distinguished by their much shorter antennæ and more robust bodies. Most of the facts in this article in regard to locusts are taken from the first annual "Report of the U. S. Entomological Commission for the year 1877, relating to the Rocky mountain locust." This valuable work is the record of investigations chiefly by profs. C. V. Riley, A. S. Packard, and Cyrus Thomas. According to Ororius, "in the year of the world 3,800 certain regions of n. Africa were visited by monstrous swarms; the wind blew them into the sea, and the bodies washed ashore 'stank more than the corpses of a hundred thousand men.'" According to St. Augustine, another locust plague, causing famine and contagious diseases, occurred in Numidia, resulting in the death of 800,000 men. Pliny states that locusts came over in great swarms from Africa to Italy in his time. Great invasions of locusts have occurred in Germany: one in 1333, lasting till 1336; another in 1475; others in 1527, 1543, 1636, 1686, 1693–96, 1712–15, 1719, 1727, 1731–34, 1746, 1750–52, 1754, 1759–61, 1803, 1825, 1830, 1856–59. In 1873–74 small numbers appeared in swarms about Genshagen, near Berlin; they laid their eggs, and in the middle of June, 1875, the larvæ appeared in millions, becoming fledged in July. Köppen has published an elaborate memoir on the migratory locust of southern Russia, and comes to the conclusion that *pachytylus migratorius* and *P. cinerascens* are only varieties of the same species, and that another genus, *œipoda*, is the same also. The form which he met with as most abundant in southern Russia is the true *pachytylus migratorius*. He describes minutely the development of the insect, the eggs of which are deposited in little nests of 60 to 100 together, surrounded by a membranous envelope. The eggs are laid in the autumn and hatched in the following spring. Köppen says the larvæ molt four times, the fourth molt producing the winged insect. The eggs taken from the ground showed the eyes, antennæ, segments, and legs of the larvæ distinctly. A little while before hatching, the larva might be seen moving within the egg. He notices the *caloptenus italicus*, the congener of the American *caloptenus spretus*, as occurring in southern Russia. Other locusts which are occasionally devastating are *pachytylus stridulus*, *œdipoda devastator*, *stauronotus vastator*, *S. cruciatus*, and *pezotettix alpina*.

The genus to which the principal species of locusts of the United States belong is *caloptenus*, and it comprises 29 species, as described by various authors, but it is thought that several of these upon further examination will be found mere varieties of closely allied species. Of these nearly all are local, and not greatly destructive; for instance, *C. floridans* has been found only in Florida; *C. griseus*, only in Ohio; *C. repletus* and *C. scriptus* only in the n.w. portion of Washington territory, and others in other regions. Only three species are so nearly allied as to require careful examination for their distinction from one another; viz., the Rocky-mountain locust, *caloptenus spretus;* the lesser locust, *caloptenus atlanis*, of the eastern states as well as western states and territories; and the red-legged locust, *caloptenus femur rubrum*. Some of the general characteristics of the genus caloptenus are as follows: head subglobular, front vertical or nearly so; vertex narrow between the eyes, being a little less than the eye itself; sides parallel, flat or slightly concave, and nearly perpendicular; dorsal surface nearly flat; the elytra and wings extend to or beyond the tip of the abdomen, the elytra being narrow, with one exception (*C. bivitatus*), and the wings transparent in all the American species, with sometimes a bluish tinge. Abdomen usually subcylindrical, having no distinct keel above; that of the male enlarged at the tip and curved upwards, the last segment being sometimes truncated, sometimes notched. Posterior thighs strong and much enlarged near the base; the external surface more or less convex, and in the female generally longer. Most of the American species have the upper portion of the inner face of the posterior thighs marked with three oblique dark bands, the one at the base less distinct; antennæ filiform and slender, much shorter than in the family *locustidæ* or so-called true grasshopper. The following are approximate measurements of the insect taken from an extensive table made by prof. Riley. Female: whole length to tip of elytra, $1\frac{1}{4}$ to $1\frac{1}{2}$ in., the elytra projecting from 0.13 to 0.28 in. beyond the tip of the abdomen. Length of male to tip of elytra, $1\frac{1}{16}$ to $1\frac{1}{8}$ in.; projection of elytra beyond abdomen, 0.2 to 0.3 inch. The species most closely allied to *C. spretus* of Thomas is *C. atlanis* of Riley, which is at once distinguished from *C. femur rubrum* by the notched last joint of the abdomen of the male, and by greater relative length of wings, which extend nearly

one-third their length beyond the tip of the abdomen in dried specimens, and also by the larger and more distinct spots on the wings. From both species it differs by its smaller size, and also by the more livid color of the dark, and paler yellow of the light, parts. Measurements of the male to tip of elytra, 0.84 to 0.93 to 0.95 to 0.98 to 1 inch. *C. femur rubrum* is larger than *C. atlanis*, but the elytra are shorter in proportion, sometimes in the female not reaching beyond the tip of the abdomen, the whole length to tip of elytra being from 1.04 to 1.22 inch. The *C. femur rubrum* is generally called the common red-legged locust, and *C. spretus* is known by the several names hopper, army grasshopper, red-legged locust, Mormon locust, western locust, hateful grasshopper, and Rocky-mountain locust, which latter is the most appropriate name. The history of the Rocky-mountain locust, the specially destructive species, is much like that of the old-world locust. It breeds over vast areas and often migrates in immense swarms for hundreds of miles beyond its usual habitat, but the American locust prefers rather cooler latitudes than the old-world insect, a large portion, nearly one-third, of its permanent breeding grounds lying in British America about the head-waters of the tributaries of lake Winnipeg. Not much can be said about the movements of the Rocky-mountain locust previous to 1864, and it is questionable by the commission whether it may not have increased in some regions since the settlement and improvement of the country, which has given them more subsistence. Neill's history of Minnesota mentions the invasion of that district of country by vast swarms of grasshoppers in 1818–19, which devastated the country and often covered the ground 3 or 4 in. deep, and in 1820 they ravaged the western counties of Missouri. In 1842 locusts again appeared in Minnesota and Wyoming, and in 1845 in Texas, and again in 1849. They have appeared in Utah from 1851 to 1877, except in 1873–74, and a portion of this territory forms one of the permanent breeding-grounds. From one year to another they have visited various portions of the territories and states. A notable locust year was 1866, when the insects swarmed over Kansas, Nebraska, the western counties of Missouri and n.e. Texas, and in Iowa, Minnesota, Colorado, and Utah. They often delayed the railroad-trains in these parts by lubricating the rails when crushed. In 1870 locusts were not plentiful, but in 1870–71 they began to increase, and in 1873 they again wrought serious ravages; but the most disastrous locust year which has been known in the country was 1874, vast destructive swarms invading settled portions of the Mississippi valley w. of the 94th meridian. Colorado, Nebraska, Kansas, Wyoming, Dakotah, Minnesota, Iowa, Missouri, New Mexico, Indian territory, and Texas were overrun by swarms from the n.w., from Montana and British America. The loss in this region was estimated at $50,000,000. In 1875 the young insects hatched in immense numbers over an area embraced by about 300 m. of latitude and 250 of longitude, embracing portions of Nebraska, Kansas, and Missouri, the two western tiers of counties of Missouri and the four tiers of counties in Kansas w. of Missouri suffered the most, about 750,000 people becoming destitute or suffering. In Missouri alone prof. Riley estimates the loss to have been $15,000,000. In Mar., 1877, prospects were bad, but there was an unusual rain-fall in April, May, and June, and much of the country along the Missouri river was flooded, and the weather was cool over Colorado, northern Utah, Montana, and British America. The young insects died in vast numbers when they hatched, and few of them lived to acquire wings. South of 40° of latitude, late in May and early in June, they flew toward the n.w. to Dakotah and Montana, whence their progenitors came.

The permanent breeding-grounds of the Rocky-mountain locust were not defined until the U. S. entomological commission made their investigation. Vague ideas were entertained, and it was known that many of the swarms came from the n.w., but there was no definite information. It was ascertained that the area in which the locust breeds each year is about 300,000 miles. They do not cover this area in breeding, but may breed any year in any part of it. It is the permanent habitat, but the most favorite breeding-grounds within the area are the river-bottoms and sunny slopes of uplands, or the grassy regions among the mountains, rather than over the more elevated, dry, and bleak plains. In central Montana the breeding-grounds are in the valleys of the Yellowstone, the upper Missouri, Gallatin, Madison, and Jefferson rivers and the grassy plains along their tributaries. These levels lie below 6,000 ft., mostly between 3,000 to 5,000 feet. The permanent area principally lies e. of the main Rocky-mountain range, between meridians 102 and 114 w. of Greenwich and between lat. 40° and 50° north. Farther w., between lat. 42° and 45° and long. 114° and 118°, there is a strip of 60 m. wide by 200 long at the head-waters of the Snake river, a tributary of the Columbia, which is a permanent breeding-ground. A subpermanent region, in which the insects breed more or less continuously, extends to the e. of the permanent region from 200 to 400 m., between parallels 39° and 53° of latitude. A temporary region extends to the valley of the n. Mississippi, passing through the states of Minnesota, Iowa, Missouri, and the north-western counties of Arkansas, and through Texas to the gulf of Mexico, thence n.w., passing through New Mexico, Arizona, Nevada, thence n. through Oregon and Washington territories to the main Rocky-mountain range in lat. 49°.

The locust is the only truly migratory insect, although swarms of butterflies have been known to fly short distances in the Mississippi valley. The locusts of the old world have been known to fly into central Europe from their permanent breeding-grounds in central Asia. In North America they often extend their flights over a distance of 1000 to

2,000 m., or from Montana to Missouri, and even to Texas. The flight generally takes place during the day, commencing early in the forenoon and ending for that day at about five o'clock in the afternoon. The rate of travel varies from 3 to 20 m. an hour, depending on the wind. Sometimes those which commence to fly in Montana the middle of July may not reach Missouri till Aug. or the fore-part of September. The swarms are designated, according to their origin and direction, *invading swarms*, or those which come in vast numbers from their permanent breeding-grounds; *returning swarms*, or those which, having hatched in an invaded district, return, as by instinct, to the permanent breeding-grounds; and *local flights*, or those to-and-fro movements of insects hatched in an invaded district.

The height in which the migrating swarms move has been the subject of observation, and differs according to locality, vastness of numbers, and direction and height of air-currents. The signal-service officer at Bismarck observed a swarm moving above the cumulus clouds. One observer states that in 1868, when upon the snowy ranges e. of Middle park, and on Long's peak, there were daily flights of full-grown grasshoppers as far as the eye could reach from the loftiest summits. Another, from Parry's peak, in 1872, speaks of them as filling the air like snow-flakes, far above the summit, 13,333 feet. It has been observed that a sudden change of wind generally brings a flying swarm to the ground. When the wind returns to the direction in which they were going they will again rise and pursue their flight. Repeated observations have confirmed this statement. A fall of temperature always brings a swarm to the ground, and this is thought to be the chief reason of their alighting in the evening. Flights, however, have been known to take place at night, or to continue during the night when the weather is warm. The opinion has been formed by some that the locust has but little power of flight except when aided by the wind, while others think it capable of sustained flight even against a gentle wind. The truth lies between these extreme views. The migratory locust has considerable power of flight for so small an animal, but would make comparatively little progress, and not prove to be the devastator that he is except for the wind. It has been observed that locusts are most numerous, whether by immigration or otherwise, in warm, dry seasons. Cold and wet prevent hatching, and do great injury to the young that are hatched.

Destructive Power of Locusts.—Prof. Riley remarks: "No one who has not witnessed the ravaging power of locusts can fully conceive of or appreciate it. Muscular, gregarious, with powerful jaws and ample digestive and reproductive systems; strong of wing, and assisted by numerous air-sacs that buoy—all these traits conspire to make it the terrible engine of destruction which history shows it to have been under conditions favorable to its excessive multiplication. Insignificant individually, but mighty collectively, locusts fall upon a country like a plague or a blight. The harvest is at hand; the day breaks with a smiling sun, and all the earth seems glad. Suddenly the sun's face is darkened and clouds obscure the sky: the day closes, and ravenous locust swarms have fallen upon the land. The morrow comes: the fertile land of promise and plenty has become a desolate waste, and the sun shines sadly through an atmosphere alive with myriads of glittering insects. Falling upon a corn-field, they convert in a few hours the green and promising acres into a desolate stretch of bare, spindling stalks and stubs. Their flight may be likened to an immense snow-storm extending from the ground to a height at which our visual organs perceive them only as minute, darting scintillations, leaving the imagination to picture them in indefinite distances beyond. When on the highest peaks of the Snowy range, 14,000 or 15,000 ft. above the sea, Mr. Byers has seen them filling the air as much higher as they could be distinguished with a good field-glass. It is a vast cloud of animated specks glittering against the sun. On the horizon they often appear as a dust-tornado, riding upon the wind like an ominous hail-storm, eddying and whirling about like the wild dead leaves in an autumn storm, and finally sweeping up and past you with a power that is irresistible. They move mainly with the wind, and when there is no wind they whirl about in the air like swarming bees. If a passing swarm suddenly meets with a change in the atmosphere, such as the approach of a thunder-storm or a gale of wind, they come down precipitately, seeming to fold their wings, and fall by the force of gravity, thousands being killed by the fall, as if upon stone or other hard surface. Col. H. McAllister, of Colorado Springs, Col., in 1875 saw a swarm suddenly come down in that place with a rain. 'The ground was literally covered 2 or 3 in. deep. In rising the next day, by a common impulse they would circle in myriads about you, beating against everything animate and inanimate, driving into open doors and windows, heaping about your feet and around your buildings, their jaws constantly at work biting and testing all things in seeking what they might devour. In the midst of the incessant buzz and noise which such a flight produces, in the face of unavoidable destruction everywhere going on, one is bewildered and awed at the collective power of the ravaging host, which calls to mind so forcibly the plagues of Egypt. The noise which their myriad jaws make when engaged in their work of destruction can be realized by any one who has fought a prairie-fire or heard the flames passing before a brisk wind.'" The eggs are laid in many kinds of soil, because choice cannot always be made by such almost illimitable hosts. Dry meadows, pastures, bare sandy places, and roadsides are overrun with the procreating swarms. The female when about to lay her eggs forces a hole in the ground by means of the two pairs of horny valves

which open and shut at the tip of her abdomen, and which from their peculiar structure are admirably fitted for the purpose. With the valves closed she pushes the tips into the ground, and by a series of muscular efforts and continued opening and shutting of the valves she drills a hole until, in a few minutes, the whole abdomen is buried. The abdomen stretches to its utmost for this purpose, especially at the middle, and the hole is generally a little curved and always more or less oblique. Now with the hind legs hoisted straight above the back, and the shanks hugging more or less closely the thighs, she commences ovipositing. When the hole is once drilled there exudes from the tip of the body a frothy mucous matter which fills up the bottom of the hole and bathes the horny valves. This is the sebific fluid which is secreted by the sebific or cement gland. An egg is laid and deposited in its place by a piece of admirable apparatus. Then follows a period of convulsions, during which more mucous material is elaborated until the whole end of the body is bathed in it, when another egg passes down and is placed in position. These alternate processes continue until the full complement of eggs is in place, the number ranging from 20 to 35. The mucous matter binds all the eggs in a mass, and when the last is laid the mother devotes some time to filling up the somewhat narrowed neck of the burrow with a compact and cellular mass of the same material, which, though light and easily penetrated, is not easily permeable by water and forms an excellent protection. The examination of one of these egg-masses is full of interest. No more perfect arrangement is found in a bee-hive; the eggs are arranged in perfect order, having a beautiful spiral appearance in one aspect and showing a quadrangular arrangement in another. The time for drilling the hole and completing the process of making the egg-mass varies with the weather, in the warmest days taking from 2 to 3 hours, but longer when the mornings and evenings are cool. The ground is often covered by the egg-laying females during the day. It has been thought by some that when the young begin to migrate they are led by kings or queens, and this idea has been formed from seeing a few members of a larger genus of *acridium* (*A. Americana*) with them, and also the coral-winged locust.

The Rocky-mountain locust takes about seven weeks from the time of hatching to attain its full size. As the transformations in the orthoptera are incomplete, there is very little difference in the general appearance of the body, except in size, between the young and the adults. The most noticeable difference is the want of wings in the young, as well as the narrower prothorax. The complete development is accomplished through a series of five molts, during the first four of which the wing-pads become more and more apparent, and during the fifth the insect more rapidly gets its full wings and ceases growing. The first three of the larval skins are shed on or near the ground, under the grass or other cover, and their dry, cast-off shells are often mistaken for dead locusts. The last two molts are made while the insect fastens itself to some elevated object. Mr. Riley says: "When about to acquire wings the pupa crawls up some post, weed, grass-stalk, or other object, and clutches it securely with the hind-feet, which are drawn up under the body. In doing so the favorite position is with the head downwards, though this is by no means essential. Remaining motionless in this position for several hours, with antennæ drawn down over the face and the whole aspect betokening helplessness, the thorax, especially between the wing-pads, is noticed to swell. Presently the skin along this swollen portion splits right along the middle of the head and thorax, starting by a transverse, curved suture between the eyes and ending at the base of the abdomen. As soon as the skin is split the soft and white fore-body and head swell and gradually extend more and more by a series of muscular contortions; the new head slowly emerges from the old skin, which, with its empty eyes, is worked back beneath, and the new feelers and legs are being drawn from their casings, and the future wings from their sheaths." This all occupies about 15 minutes, and the newly formed insect now turns round and clambers up the cast-off skin, and there rests while the wings expand and every part of the body hardens and gains strength. In 10 or 15 minutes from the time of extrication the wings are fully expanded, and hang down like dampened rags. From this point on the broad hind-wings begin to fold up like fans beneath the narrower front ones, and in another 10 minutes they have assumed the normal attitude of rest. Without careful inspection one would be puzzled to know how the now stiff legs had been drawn out of their old cases; but they were exceedingly flexible and capable of bending at every part over the flexed knee-joint of the case. The whole operation, from the bursting of the skin to the full development of wings, occupies from one-half to three-quarters of an hour.

The locust has many enemies, or animals that prey upon it. One of the most remarkable is the *anthomyiæ angustifrons*, or egg-parasite, the most widespread of all the egg-feeders. In 1876 this parasite destroyed about one-tenth of all the eggs laid in Missouri, Kansas, and Nebraska; many were seen also in Iowa, Minnesota, Colorado, and Texas. The larva of this insect is a little less than a quarter of an inch long, and sometimes a dozen or more are found in the same locust-egg-pod, where they suck the juices of the eggs. The winged insect is about the length of the larva, with a spread of wing about twice as great. The larvæ of the common flesh-fly also feed upon locust-eggs, and many species of ground-beetles also feed upon them, sometimes settling in swarms in fields where locust-eggs have been laid, and often completely devouring them. They also devour the full-grown locusts. The locust mite (*trombidium locustarum*,

Riley) preys upon the adult locust. In the spring the female of this parasite lays from 300 to 400 minute eggs about 2 in. beneath the surface of the ground in the locust-fields. Minute orange-colored mites hatch from these eggs, crawl upon the locusts, and fasten themselves at the base of the wings. The digger-wasps (*larada semirufa*) also catch locusts, sting them, and bury them in their nests for the sustenance of their newly hatched young. But the birds are the great natural destroyers of the locusts, and flocks of them have been known to clear a field in a few minutes. See INSECTIVOROUS BIRDS.

Various methods have been devised by the farmers to destroy locusts or prevent their depredations. One method which has been successfully practiced to save a small crop is to drag ropes over the surface of the grain, repeating the operation until the insects are driven to other parts. The encouragement of the fly-catching birds is one of the effective measures, and the commission advise the offering of rewards for hawks. This has been done with beneficial results in Colorado and other states. The destruction of the eggs may be accomplished on a great scale by harrowing, plowing, and irrigation, the latter method sometimes being much the most economical. Young locusts, before they are winged, may be destroyed by burning the fields when this is feasible. The older locusts are destroyed in various ways by different kinds of apparatus. Some crush them between rollers, some gather them in nets, bags, and other receptacles mounted on wheels and pushed about by hand or driven by horse-power. One of the most efficient pieces of apparatus is the coal-tar pan, known as "Robbins's hopperdozer."

General Anatomy.—This has much in common with other insects, but the proportions vary. A superficial inspection of the locust will show that its body is covered with a hard, articulated shell which protects the internal organs, the articulations having the general form of rings, many of which are again subdivided into pieces. There are 17 of these rings or segments, disposed in three regions, four segments composing the head, three the thorax, and ten the abdomen. The legs consist of five well-marked joints, the tarsi or feet having *three* joints, and the third joint having two large claws, with a pad between them. The so-called true grasshoppers have tarsi with four joints, and also shrilling organs at the base of the wings, which the locusts have not. The hind-legs, especially the thigh and shank, are very large and well adapted to hopping. The sternum is broad and large. The head in the adult locust is chiefly composed of a single piece called the epicranium, and carries the compound eyes, the ocelli or simple eyes, and the antennæ. While there are in reality four primary segments in the head of all winged insects, corresponding to the four pairs of appendages in the head, the posterior three segments, after early embryonic life in the locust, come to be represented only by their appendages and small portions to which the appendages are attached. The epicranium represents the antennal segment, and most of the piece represents the tergum, or upper portion of the segment. The antennæ, or feelers, are situated in front of the eyes, and between them is the anterior ocellus, while the two posterior ocelli are situated above the insertion of the antennæ. In front of the epicranium is the clypeus, a piece nearly twice as broad as long, and to this is attached a loose flap covering the jaws when they are at rest. This is the upper lip or labrum. There are three pairs of mouth appendages: 1, the true jaws or mandibles, situated on each side of the mouth; 2, the maxillæ, divided into three lobes, the inner armed with spines, the middle unarmed and spatula-shaped; while, 3, the outer lobe is a five-jointed feeler, called the maxillary palpus. The floor of the mouth is formed by the labium, which is composed of two second maxillæ, fused together in the middle line. Within the mouth the tongue is placed upon the labium, and is a large, membranous, hollow expansion of the latter organ (Packard). The internal anatomy of the locust is really marvelous, although not very complex. The esophagus terminates at the center of the head, where the crop commences, and where there is a slight constriction with oblique folds armed with spine-like teeth. After leaving the head the folds in the crop become longitudinal, upon which the teeth are arranged in rows, each row, composed of groups of from three to six teeth, pointing backward, so as to push the food into the stomach. It is in the crop that the substance known as "molasses" is produced, and which is the partly digested food, mingled with the secretion of the crop. The true or chyle stomach commences a little behind the insertion of the middle pair of legs. It is paler than the crop, which is of a flesh color. Between the crop and stomach, externally, there are six remarkable organs, called gastric cæca. They are of a sacculated, spindle shape, placed longitudinally side by side, surrounding the posterior part of the crop and the anterior part of the true stomach, and when dilated touching each other at the middle. The anterior ends are attached to the latter third of the crop, while the posterior and more pointed extremities float freely in the body cavity, and pour into it the chyle of the stomach, insects having no system of lacteal vessels. These cæca are true dilatations of the chyle stomach. The uriniferous tubes are situated at the junction of the posterior extremity with that portion of the intestinal canal called the ileum. These tubes are arranged in 10 groups of about 15 tubes each, which, when stretched out, are about as long as the body, and are convoluted around the alimentary canal. There is an ileum, a colon, and a rectum, the latter having six large rectal glands on the outside, held in place by six muscular bands. The nervous system of the locust consists of a series of nerve-centers connected by bands. These centers or ganglia are: 1, supra-esophageal gan-

glion, or brain, which furnishes the eyes and the ocelli with nerves; 2, infra-esophageal ganglion; 3, three thoracic ganglia connected by double cords; and 4, five abdominal ganglia connected by single medial cords. There is also a sympathetic system, composed of three principal ganglia, and a not otherwise complex system of nerves. The respiration is much like that in other insects. See INSECTS. In the female the ovaries, immediately before ovipositing, occupy a considerable portion of the abdomen, and consist of two masses of tubes, with air-sacks and tracheæ ramifying among them. There are from 17 to 22 tubes in each ovary in *C. femur rubrum*, and more in *C. spretus*, sometimes as many as 50 in each, or 100 in both. Indeed, the mouth, crop, stomach, and reproductive system of the migratory locust may be said to practically occupy the whole of the body cavity, the whole physical energy being spent in devouring and multiplying. As to the organs of sense they have two large, well-developed compound eyes, and three ocelli or simple eyes, which, no doubt, very well serve the purpose of vision. The antennæ are probably organs of taste as well as of touch, but it is not known whether the tongue has any gustatory sense. The ears are well developed, and there is no doubt but that the sense of hearing is acute from the fact that drums and kettles are efficient means of disturbing these insects.

LOCUST TREE, a name given in different parts of the world to different trees of the natural order *leguminosæ*.—The carob tree (*ceritonia siliqua*) is often so called in the countries bordering on the Mediterranean, and its pods are the locust beans of our shops. See CAROB. A kind of effervescing beer, made from locust or carob pods, has been sold in London.—The LOCUST TREE of America (*robinia pseudacacia*), also called the FALSE ACACIA, or THORN ACACIA, and on the continent of Europe and in Britain, very generally the ACACIA, is a valuable and extremely beautiful tree. See ROBINIA. The wood, known as *locust wood*, is useful for all purposes in which great strength, and especially toughness, is required; this latter quality, which it possesses pre-eminently, makes it very valuable for trenails used in ship-building, and large quantities are imported for this purpose. It is also valuable for making the cogs of wheels.—The HONEY LOCUST (q.v.) TREE of America is a *gleditschia*.—The LOCUST TREE of the West Indies is *hymenæa courbaril*, a gigantic tree, whose pods also supply a nutritious matter, a mealy substance in which the pods are imbedded. It is sweet and pleasant, but apt to induce diarrhea when recently gathered, which property, however, it loses when kept for a short time. A decoction of it, allowed to ferment, makes a kind of beer. The bark of the tree is anthelmintic; it yields a kind of resin called anime (q.v.), and it is valuable as a timber-tree, the timber (also known as *locust wood*) being close-grained and tough, and in request in England for trenails. It is very generally imported in the form of trenails.

LODE, a miner's term for veins (q.v.) in which minerals occur. They are crevices, more or less vertical, produced by contraction, or the mechanical disturbance of the rock, which have subsequently been filled with metallic ores.

LODÈVE (ancient *Luteva* in *Gallia Narbonensis*), a t. of southern France, in the department of Hérault, situated on the Ergue, in a beautiful valley, 32 m. n.w. of Montpellier. It is inclosed by walls, has a cathedral, with manufactures of woolen cloths. Pop. '76, 10,198. Lodève is the birthplace of cardinal Fleury.

LODGE, THOMAS, 1556–1625; b. Lincolnshire, Eng.; studied at Oxford, but left without taking a degree, and went to London; became an actor and began to write for the stage about 1580, producing his *Defense of Stage Plays*. In 1584 he studied law at Lincoln's inn, and soon after accompanied Clarke and Cavendish as a soldier on their expeditions. Some time afterwards he studied medicine, and took a degree at Avignon. Returning to London he practiced with success, and published in 1603 a *Treatise of the Plague*. As a dramatist he occupies a high rank. His extant plays are: *The Wounds of Civil War lively set forth in the True Tragedies of Marius and Sylla; A Looking-glass for London and England*. In 1819 a collection of his pastoral and lyric poetry was published. His novel *Rosalynde: Euphues Golden Legacie*, found in his cell after his death at Silexedra, gave Shakespeare the framework of the plot in his *As You Like It*. In its prose descriptions and narratives, as well as in the interspersed verses, the novel is often finely poetical. *A Margarite of America*, written probably during his voyage with Cavendish, was published in 1596. He translated Josephus and Seneca. While a student at Lincoln's inn he published *Alarum against Usurers*. He is said to have died of the plague.

LODGED, in heraldry. A beast of chase, as a stag, is said to be lodged when lying down with its head erect; a beast of prey in the same position is said to be couchant.

LODGING-MONEY is an allowance, in the British army, granted to officers and others, for whom suitable quarters cannot be provided in barracks. Married sergeants and private soldiers who are married "with permission," are entitled to lodging-money at various rates up to 8s. a week, when separate rooms in barracks cannot be spared for the accommodation of each couple. The total charge for lodging-money in the army estimates amounts to about £100,000.

LODGINGS, or the use of part of another person's house, when occupied, constitute the relation of landlord and tenant between the parties. Lodgings being generally taken by the week, or month, or quarter, it is not necessary that the contract should be

by writing, though it is expedient, especially where any particular stipulations are made. But where a furnished house is let, and a written agreement or lease is used, it is absolutely necessary that there should be a stamp on such writing, which must be canceled by the parties under a penalty of £5 besides stamp-duty; and house-agents who let furnished houses above £25 for hire, must now take out an annual license, and pay duty. In England, the chief points of law which arise are as follows: One of the risks which the lodger runs is that, if his landlord, L, is himself a tenant to A, somebody else, then, if L's rent is in arrear, the lodger's goods may be taken by A to pay this, for the rule is, that all goods found on the premises, to whomsoever belonging, may be seized to pay arrears of rent, and it is immaterial whether the landlord A, who distrains, knows they are not L's, but the lodger's goods. The only remedy in such a case for the lodger is to deduct the amount of loss from the next rent he pays to L for lodgings. Hence, in order to learn whether the above risk is impending, a lodger frequently inquires beforehand at the landlord of the house, A, and the tax collectors, whether rent, etc., is in arrear. A lodging-house keeper, even where he keeps a boarding-house, which nearly resembles an inn, is not liable for the safe custody of the lodger's goods. He is merely liable for ordinary care; but he does not warrant at all hazards that the goods will not be stolen, as an innkeeper (q.v.) does. Even if the lodger's goods are stolen by a servant of the house, the lodging-house keeper is not liable. The notice to quit depends on how the lodgings were taken. If they were taken by the week, a week's notice is sufficient; if by the month, a month's; and if by the quarter, a quarter's notice, unless some other agreement was made. Hence, if the lodger quit without notice, he is liable for one week's, or month's, etc., rent, even though the landlord put a notice in the window. The lodging-house keeper may distrain the lodger's goods for unpaid rent. When a lodger refuses to quit the lodgings after a notice has expired, he cannot be put out by force, but in many cases a summary remedy is given for recovering possession. In Scotland, the lodger's goods cannot be taken by the landlord of the lodging-house keeper for rent. A lodger, whatever rent he pays, yet not being rated to the poor, etc., is not entitled to vote for members of parliament; though it is said that in Scotland a different practice prevails in some places (Burton's *Law of Scotland*, 38). *Common lodging-houses*, where poor people lodge by the night, have recently been subjected to state interference; and by statutes 14 and 15 Vict. c. 28, and 16 and 17 Vict. c. 41, the keepers of such lodging-houses must register them. They are liable to be inspected by an officer of the board of health for sanitary purposes, and the keepers are bound, on notice, to report to the local authority every person who resorted to their houses during the preceding day or night. The keepers are bound to thoroughly cleanse all the rooms, stairs, etc., as often as by-laws shall direct, and to keep a proper supply of water. If fever break out, notice must be given to the local authority. These duties are enforced by means of penalties. These statutes were extended to Ireland by the statutes 23 and 24 Vict. c. 26.

LO'DI, a flourishing t. of north Italy, in the province of Milan, stands on the right bank of the Adda, 19 m. s. of Milan, on a gentle slope in the midst of a highly fertile district, and contains 20,000 inhabitants. It is protected by walls and a strong castle, erected by the Visconti, but lately appropriated as a military hospital. Lodi is a bishop's see and the seat of a college, and contains many fine buildings. Its chief manufactures are linens, silks, chemical products, and Majolica porcelain, for which it is famous. Its great trade is in cheese, especially the famous species known as Parmesan, which, instead of being manufactured at Parma, as one might infer from the name, is exclusively made in the vicinity of Lodi, where 80,000 cows are kept for the purpose.—LODI VECCHIO, or Old Lodi, is a ruined village about 5 m. w. of the modern town; it was founded by the Boii, and colonized by the father of Pompey the great, hence its name, *Laus Pompeia*, which was gradually corrupted into the modern name of *Lodi*. Lodi is celebrated for the victory of the French, under Bonaparte, over the Austrians, on May 10, 1796, when the long and narrow bridge was carried by the French columns, notwithstanding a tremendous fire from the Austrian batteries.

LODOME'RIA, the Latin name of a principality annexed by Russia in the 11th century. At the partition of Poland, 1772, Austria gave the name Galicia and Lodomeria to her share of the spoils, though Russia retained the old province of Lodomeria.

LODZ (Russ. *Lodsi*), a t. of Poland, in the government of Piotrkow, and 75 m. s.w. from Warsaw. It is situated in a level fertile country, on a small feeder of the Ner, a branch of the Vistula. After Warsaw itself, Lodz is the largest town in Poland, and is remarkable for the activity with which different branches of industry are prosecuted, particularly the manufacture of cloth and other woolen stuffs. There is also a considerable trade, which is likely to be much promoted by a branch railway opened in 1865, connecting Lodz with the great Warsaw and Vienna line. The inhabitants of Lodz are mostly Germans, or of German origin. Its population has of late increased with great rapidity. At the beginning of the 19th c., the town had only a few hundred inhabitants; in 1854, the pop. had increased to 23,302; in 1860, to 31,564; and in 1867 it had risen to 34,328.

LO'ESS, a loamy deposit of pleistocene age, occurring in the valleys of the Rhine and the Danube. It consists of a pulverulent loam of a yellowish-gray color, made up prin-

cipally of argillaceous matter, combined with a sixth part of carbonate of lime, and a sixth of quartzose micaceous sand. In the Rhine, it apparently once covered the whole valley and its tributaries, reaching to a considerable height up the bounding mountains. It has subsequently been greatly abraded, a fringe only of the deposit being left on the mountain-sides, and occasionally some outliers in the widest parts of the valley; the materials have been carried down by thê river, and rearranged, as a newer loess or alluvium, in Belgium and Holland. This continuous deposit of fine sediment suggested the notion to the original observers of an enormous lake, whose barrier was at the narrow gorge of the Rhine at Bingen. But the loess occurs further down; besides the contained fossils are not lacustrine, but those of land-animals (*elephas* and *rhinoceros*), and land-shells (*helix*, *pupa*, and *succinea*). It is now believed to be the moraine mud of the Alpine glaciers, which was spread out gently in the valleys of the Rhine and Danube, as the land gradually emerged from the sea. The loess is generally from 30 to 50 ft. in thickness, though sometimes as much as 200 feet. Fossils are not generally distributed in the strata, but they are sometimes locally abundant. They consist chiefly of land-shells of species now inhabiting the same region.

LOFO'DEN, LOFFO'DEN, or LOFO'TEN, a chain of islands on the n.w. coast of Norway, between lat. 67° and 69° 15′ n., and stretching s.w. and n.e. for 175 miles. The largest of the islands are Hindöe, Andöe, and Langöe, Ost Vaagen, West Vaagen, and Flagstadöe. All of them are rugged and mountainous; indeed, some of the eminences in Vaagen attain an altitude of 4,000 ft., and are covered with perpetual snow. The glens near the coast possess a temperature mild enough to allow of the cultivation of oats, barley, and potatoes. The permanent pop. is estimated at 4,000. The islanders chiefly depend upon the fishery which was established some time previous to the 11th c. and has always attracted a large number of the inhabitants of the mainland. The average number of boats is 4,000, manned by 20,000 fishermen; and the produce of the cod-fishery is estimated at 9,000 tons of dried fish, 22,000 barrels of oil, and 6,000 barrels of roe. After the cod-fishery has terminated (in April), the herring-fishing season comes on, and continues throughout the summer, forming also an important branch of national industry. Several other kinds of fish are caught, and lobsters and oysters in abundance. The fishing is attended with considerale danger, on account of the sudden and violent storms from the w., and of the strong currents which set in between the islands. See MAELSTROM. The inhabitants are a mixed race, partly of Scandinavian, partly of Lappish descent.

LOFTUS, WILLIAM KENNETT, 1820–58; b. England. From 1849 to 1852 he was a resident of Turkey, and, devoting himself to archæology, made extensive explorations on the sites of the ancient cities on the Tigris and Euphrates. He made renewed examinations in the same field under the auspices of the Assyrian society of London in 1853, and a few years later published a volume of his *Travels and Researches in Chaldea and Susiana*, with illustrations. His contribution of specimens of ancient Assyrian sculpture to the British museum are highly valued.

LOG is the instrument by which a ship's rate of motion through the water is measured. Its simplest form is a triangular piece of light wood, leaded so as to swim vertically; this is connected with the log-line so that its flat surface is at right angles to the ship's course. When thrown out—attached to the log-line (see KNOT)—the log meets with such resistance that it theoretically remains stationary in the water, and the log-line passing freely out shows the speed of the vessel. There are, however, many improved logs, which have complicated apparatus, for marking the way made, changes of direction, etc. The log and line are known to have been used as early as 1570 A.D., and were alluded to by Bourne in 1577. Computing by the log is an uncertain operation, allowance having to be made for numberless contingent circumstances. In ships of war, it is usual to heave the log every hour; in merchantmen, every two hours. The *log-board* is a board on which the hourly results of the log-heaving are recorded in chalk, with the wind's direction, and other particulars, for the guidance of the officer in charge. The contents of the log-board are entered daily in the *log-book*, with all particulars essential to the history of the voyage, as ships spoken, icebergs seen, land sighted, etc. The *log-book* thus becomes a rough journal; and it is compulsory upon every master of a vessel to keep it properly, and to have it ready for inspection by any ship of war of his own nation whose captain may require its production.

LOGAN, a central co. of Dakotah; 1800 sq.m.; formed since the census of 1870. It includes a large portion of the *Plateau du Coteau du Missouri*, elevated prairie land, dry and thinly settled, lying between 98° and 99° w. long., and 45° and 48° n. lat.

LOGAN, a central co. of Illinois, 574 sq.m.; pop. '80, 25,041; watered by Salt, Kickapoo, and Sugar creeks. It is traversed by the Pekin division of the Wabash, and the Chicago and Alton, and Gilman, Clinton and Springfield railroads. The soil is very fertile, mostly prairie land; productions: wheat, oats, hay, cattle, and pork. In 1870 this county produced 4,221,640 bushels of Indian corn, being more than any other county in the United States, except Sangamon co. in the same state. Timber is very scarce, but there is an abundance of coal. Co. seat, Lincoln.

LOGAN, a co. in Kentucky, immediately s. of the Tennessee state line; 600 sq.m.; pop. '80, 24,358; traversed by the Memphis, Clarksville and Louisville railroad. The surface is varied, the soil fertile; productions: tobacco, wool, cotton, and grain. Co. seat, Russellville.

LOGAN, a w. central co. in Ohio; 415 sq.m.; pop. '80, 26,628; undulating surface and productive soil. Live stock, wool, and grain are the most important productions, and there are manufactures of flour, furniture, lumber, etc. The Cincinnati and Sandusky, and the Cleveland, Cincinnati and Indianapolis railroads traverse this county. Co. seat, Bellefontaine.

LOGAN, a co. in West Virginia, n.e. of the Kentucky line, from which it is separated by a fork of the Big Sandy river; 825 sq.m.; pop. '80, 7,329; watered by the Guyandotte river. The surface is varied, chiefly hilly, and the soil is productive. This county possesses great mineral wealth, yielding coal and iron, salt and petroleum. Co. seat, Logan Court-House.

LOGAN, 1720–80; the name adopted by the Indian chief Tah-gah-jute, in honor of his friend gov. Logan of Pennsylvania. Prior to 1770 he lived in Pennsylvania, where his father, a chief the Cayugas, had lived before him. He was well known on the Pennsylvania and Virginia frontier, a brave chief, of noble presence, always friendly to the whites, and endeared to them by his many good qualities. In 1770 he removed to the shores of the Ohio river with his family, and there fell into intemperate habits. In 1774 Logan's family were murdered by a marauding band of whites. This cruel and cowardly act roused the chief to a determination for vengeance, and he devoted himself to stimulating the tribes to rise against the white settlers. In this he was completely successful, and a savage war began, which lasted six years, with the most terrible cruelties, in the performance of which Logan himself was pre-eminent. He is said to have taken thirty scalps with his own hands. The war closed with the defeat of the Indians, but Logan refused to join the other chiefs in begging for peace with the whites. Instead of any such act of submission, he sent an address to lord Dunmore, governor of Virginia, first published by Thomas Jefferson in his *Notes on Virginia*. Its authenticity has been questioned, but it has popularly been accepted as a genuine instance of Indian eloquence. Although often reprinted in school readers and other ephemeral works, it is sufficiently characteristic and pertinent to deserve permanent preservation. "I appeal to any white man to say if ever he entered Logan's cabin hungry, and he gave him not meat; if ever he came cold and naked, and he clothed him not. During the course of the last long and bloody war Logan remained idle in his cabin, an advocate for peace. Such was my love for the whites that my countrymen pointed as they passed, and said, Logan is the friend of the white man. I had even thought to have lived with you, but for the injuries of one man. Col. Cresap, the last spring, in cold blood and unprovoked, murdered all the relations of Logan, not even sparing my women and children. There runs not a drop of my blood in the veins of any living creature. This called on me for revenge. I have sought it; I have killed many; I have fully glutted my vengeance. For my country I rejoice at the beams of peace. But do not harbor a thought that mine is the joy of fear; Logan never felt fear. He will not turn on his heel to save his life. Who is there to mourn for Logan? Not one." It is doubted if the officer to whom Logan refers was concerned in the massacre of his family. The chief now fell a complete victim to intemperance, became quarrelsome and dangerous, and was eventually killed by a relative in self-defense.

LOGAN, Cornelius A., b. Baltimore, 1800; of Irish descent; after sailing as supercargo, became a journalist, then an actor and dramatist. He had three daughters, Olive, Eliza (Mrs. Geo. Wood, 1830–72), and Cecilia, all actresses of talent; of whom the first is also a lively writer. A poem entitled *The Mississippi* was one of Mr. Logan's well-known productions.

LOGAN, George, 1753–1821; b. Stenton, Penn.; educated in England, and after three years' study at the medical school in Edinburgh made the tour of Europe. Returning to America in 1779, he spent some time in applying science to agriculture, and subsequently was a member of the legislature for several terms. At the commencement of the French revolution he joined the party of Jefferson and the republicans against the federalists. In 1798 he went to Europe as a private citizen to use his influence to prevent a threatened war between France and the United States, having received letters of introduction from Jefferson instead of passports from the secretary of state. Though successful in inducing the French government to annul the embargo on American shipping, and in preparing the way for a negotiation resulting in peace, he was denounced as the treasonable envoy of a faction by the federalists, who afterwards had an act passed by congress, called the *Logan act*, making it a high misdemeanor for a private citizen to interfere in a controversy between the United States and a foreign country. He was a member of the U. S. senate 1801–7, and in 1810 went as a volunteer to England for the purpose of settling difficulties between Great Britain and the United States, but the mission was fruitless. He was a member of the philosophical society and of the board of agriculture. He published *Experiments on Gypsum*, and on the *Rotation of Crops*. In religion he was a member of the society of Friends.

LOGAN, JAMES, 1674–1751; b. Lurgan, Ireland, of Scotch Quaker stock; was well educated, and entered into business as a merchant; in 1699 accompanied William Penn to Pennsylvania, where he held various public offices, such as provincial secretary, chief-justice, president of council, acting governor, etc. He wrote *Experimenta de Plantarum Generatione*, a translation of Cicero's *De Senectute*, and other works in Latin and in English prose and verse. Died at Stenton, near Germantown.

LOGAN, JOHN, 1748–88; b. Midlothian, Scotland; educated at Edinburgh university, and settled as minister of Leith in 1773. His first literary work was a series of lectures on the philosophy of history, followed, in 1781, by a volume of hymns and odes. It is claimed that the *Ode to the Cuckoo*, by far the best of these, was stolen from the papers of Michael Bruce, a deceased friend. The other poems, however, possess some merit. They may be found in Anderson's collection. Of his tragedies, *Runnamede* (1783) is alone worthy of note. A review of the charges against Warren Hastings caused the prosecution of the author. Logan lost his position at Leith through his play-writing, and charges of immorality, and died in London. In 1790 a collection of his sermons was published. They have great vigor and earnestness.

LOGAN, JOHN A., b. Jackson co., Ill., 1826; received a limited common-school education; at the outbreak of the war with Mexico enlisted as a private, but became quartermaster of his regiment, with the rank of first lieut.; after the close of the war was elected clerk of the court of his native county; in 1852 graduated at the Louisville university, and afterwards was admitted to the bar; was a member of the state legislature in 1852–53 and 1856–57, and prosecuting attorney from 1853 to 1857; was elected to congress in 1858 and again in 1860, resigning his seat in 1861 to enter the army. He was made colonel of the 31st Illinois volunteers, and led the regiment in the battles of Belmont and fort Donelson; was wounded in the latter engagement, and in Mar., 1862, was appointed brig.gen. of volunteers, and a few months later, maj.gen.; in the Vicksburg campaign was in command of a division of the 17th corps, distinguishing himself at Port Gibson, Champion hills, and in the siege and surrender of Vicksburg. In 1863 he was put in command of the 15th corps, which he led with valor until the death of McPherson, when he took command for a time of the army of the Tennessee. On being relieved by gen. O. O. Howard he returned to the command of his corps, which he led until the fall of Atlanta, when he obtained leave of absence to engage in the effort to re-elect Abraham Lincoln for president. He afterwards rejoined his corps, leading it in the march through the Carolinas, and until he succeeded gen. Howard in command of the army of the Tennessee. Having resigned from the army in Aug., 1865, he was in the following Nov. appointed minister to Mexico, but declined. He was subsequently elected to congress for two successive terms, and in 1871 to the senate of the United States, of which he is still (1881) a member. He is an earnest advocate of the principles of his party, and is a strong and ready speaker.

LOGAN, Sir WILLIAM EDMOND, LL.D., 1798–1875; b. Montreal, Canada; graduated at the university of Edinburgh in 1817, and in 1818 became partner in a mercantile house in London; 1829–38, manager of a mining enterprise at Swansea, Wales; in 1841 became head of the geological survey of Canada; represented that country in the expositions of 1851 and 1862 at London, and in that of Paris in 1853; was made a knight of the legion of honor in 1855, and a knight-bachelor by the queen in 1856. Died in Wales.

LOGANIA'CEÆ, a natural order of exogenous plants, consisting of trees, shrubs, and herbaceous plants, with opposite entire leaves, and usually with stipules, which adhere to the footstalks or form sheaths. The calyx is 4–5-partite; the corolla hypogynous, regular or irregular, 4–5- or 10-cleft. The stamens arise from the corolla. The ovary is generally 2-celled; there is one style. The fruit is a capsule, a drupe, or a berry. A few species of this order occur in Australia and in the temperate parts of North America; the rest are all tropical or subtropical. There are about 162 known species. No natural order of plants is more strongly characterized by poisonous properties. It includes the genus strychnos (q.v.), of which nux vomica (q.v.) is one of the products, and another is the woorali (q.v.) poison. *Strychnine* (q.v.) is a prevalent and peculiar characteristic principle of the loganiaceæ. Some of the order, however, are of use in medicine, as certain species of spigelia (q.v.).

LOGANSPORT, a city in Indiana, capital of Cass co.; at the junction of the Wabash and Eel rivers; pop. '70, 8,950; reached by the Detroit, Eel river, and Illinois; Logansport, Crawfordsville, and South-western; Pittsburgh, Cincinnati, and St. Louis; and Toledo, Wabash, and Western railroads. It is the center of a productive region, well wooded, and rich also in building-stone. There is a Universalist college and public-school buildings, 14 churches, banks, etc. The city is handsomely laid out and well paved, with fine residences and stores. It has important manufacturing industries, employing more than 1000 operatives.

LOGARITHMIC or LOGISTIC **CURVES** are curves whose abscissæ are proportional to the logarithms of the corresponding ordinates; consequently, if the abscissæ increase in arithmetical progression, the ordinates will increase in geometrical progression. The equation to these curves being $x = a \log. y$ (a being constant), $y\frac{dx}{dy} = a$, showing that

the subtangent has the same value for all points of the curve, and is the modulus (q.v.) of the system of logarithms represented by the particular curve. This curve has another remarkable property, viz., that the area contained between any two ordinates is equal to the difference of the ordinates multiplied by the constant subtangent.

LOGARITHMIC or LOGISTIC **SPIRAL** is a curve described by a point which moves uniformly along a uniformly revolving straight line. This curve has several remarkable properties, some of which are analogous to those possessed by the logarithmic curve. Its involute and evolute are the same with itself. Newton showed that if the force of gravity had varied inversely as the *cube* of the distance, the planets would have shot off from the sun in logarithmic spirals. The equation to the curve is $r = ca^x$.

LOGARITHMS, a series of numbers having a certain relation to the series of natural numbers, by means of which many arithmetical operations are made comparatively easy. The nature of the relation will be understood by considering two simple series such as the following, one proceeding from unity in geometrical progression, the other from 0 in arithmetical progression:

Geometrical series—1, 2, 4, 8, 16, 32, 64, 128, 256, 512, etc.
Arithmetical series—0, 1, 2, 3, 4, 5, 6, 7, 8, 9, etc.

Here the ratio of the geometrical series is 2, and any term in the arithmetical series expresses how often 2 has been multiplied into 1 to produce the corresponding term of the geometrical series; thus, in proceeding from 1 to 32, there have been 5 steps or multiplications by the ratio 2; in other words, the ratio of 32 to 1 is compounded five times of the ratio of 2 to 1. It was this conception of the relation that led to giving the name of *logarithms* to the arithmetical series, the word *logarithm* (Gr. *logon arithmos*) meaning "the number of the ratios." As to the use that may be made of such series, it will be observed that the sum of any two logarithms (as we shall now call the lower series) is the logarithm of their product; e.g., 9 (= 3 + 6) is the logarithm of 512 (= 8 × 64). Similarly, the difference of any two logarithms is the logarithm of the quotient of the numbers; a multiple of any logarithm is the logarithm of the corresponding number raised to the power of the multiple; e.g., 8 (= 4 × 2) is the logarithm of 256 (= 16^2); and a submultiple of a logarithm is the logarithm of the corresponding root of its number. In this way, with complete tables of numbers and their corresponding logarithms, addition is made to take the place of multiplication, subtraction of division, multiplication of involution, and division of evolution.

In order to make the series above given of practical use, it would be necessary to complete them by interpolating a set of means between the several terms, as will be explained below. We have chosen 2 as the fundamental ratio or base, as being most convenient for illustration; but any other number (integral or fractional) might be taken; and every different base, or *radix*, gives a different system of logarithms. The system now in use has 10 for its base; in other words, 10 is the number whose logarithm is 1.

The idea of making use of series in this way would seem to have been known to Archimedes and Euclid, without, however, resulting in any practical scheme; but by the end of the 16th c., trigonometrical operations had become so complicated that the wits of several mathematicians were at work to devise means of shortening them. The real invention of logarithms is now universally ascribed to John Napier (q.v.), baron of Merchistoun, who in 1614 printed his *Canon Mirabilis Logarithmorum*. His tables only give logarithms of sines, cosines, and the other functions of angles; they also labor under the three defects of being sometimes + and sometimes −, of decreasing as the corresponding natural numbers increase, and of having for their *radix* (the number of which the logarithm is 1) the number which is the sum of $1 + 1 + \frac{1}{1.2} + \frac{1}{1.2.3} +$, etc. These defects were, however, soon remedied: John Speidell, in 1619, amended the tables in such a manner that the logarithms became all positive, and increased along with their corresponding natural numbers. He also, in the sixth edition of his work (1624), constructed a table of Napier's logarithms for the integer numbers, 1, 2, 3, etc., up to 1000, with their differences and arithmetical complements, besides other improvements. Speidell's tables are now known as *hyperbolic logarithms*. But the greatest improvement was made in 1615 by prof. Henry Briggs (q.v.), of London, who substituted for Napier's inconvenient "radix" the number 10, and succeeded before his death in calculating the logarithms of 30,000 natural numbers to the new radix. Briggs's exertions were ably seconded; and before 1628 the logarithms of all the natural numbers up to 100,000 had been computed. Computers have since chiefly occupied themselves rather in repeatedly revising the tables already calculated than in extending them.

Construction of Tables.—The following is the simplest method of constructing a table of logarithms on Briggs's system. The log. of 10 = 1·; the log. of 100 (which is twice compounded of 10) = 2·; the log. of 1000 = 3·, etc.; and the logarithms of all powers of 10 can be found in the same manner. The intermediate logarithms are found by continually computing geometric means between two numbers, one greater and the other less than the number required. Thus, to find the log. of 5, take the geometric mean between 1 and 10, or 3·162..., the corresponding arithmetic mean (the log. of 1 being 0, and that of 10 being 1·) being ·5; the geometric mean between 3·162... and 10, or 5·623..., corresponds to the arithmetic mean between ·5 and 1·, or ·75; the geometric

mean between 3·162... and 5·623..., or 4·216..., has its logarithm $= \frac{1}{2}(\cdot 75 + 5)$, or ·625; this operation is continued till the result is obtained to the necessary degree of accuracy. In this example, the twenty-first result gives the geometric mean = 5·000,003, and the corresponding arithmetic mean = ·698,970, which is in ordinary calculations used as the logarithm of 5. Since division of numbers corresponds to subtraction of logarithms, and since $2 = \frac{10}{5}$, the log. of 2 = log. 10 − log. 5 = 1· − ·698970 = ·301030. The logarithms of all prime numbers are found in the same way as that of 5; those of composite numbers are obtained by the addition of the logarithms of their factors; thus, the log. of 6 = log. 2 + log. 3 = ·301030 + ·477121 = ·778151. This method, though simple in principle, involves an enormous amount of calculation; and the following method, which depends on the modern algebraic analysis, is much to be preferred. According to this method, logarithms are considered as indices or powers of the radix; thus, $10^0 = 1$, $10^{\cdot 301030} = 2$, $10^{\cdot 477121} = 3$, $10^2 = 100$, etc.; and the laws of logarithms then become the same as those of indices. Let r represent the radix, y the natural number, x its logarithm; then $y = r^x$, or, putting $1 + a$ for r, $y = (1 + a)^x$; and it is shown by the binomial and exponential theorems (see the ordinary works on algebra) that $y = 1 + Ax + \frac{A^2x^2}{1.2} + \frac{A^3x^3}{1.2.3} +$, etc., where $A = r - 1 - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 -$, etc., the former equation expressing a number as the sum of different multiples of its logarithm and the radix. If $\frac{1}{A}$ be substituted for x, then $y = r^{\frac{1}{A}} = 1 + 1 + \frac{1}{1.2} + \frac{1}{1.2.3} +$, etc. = 2·71828182..., which, as before mentioned, is Napier's radix, and is generally called e; then $r^{\frac{1}{A}} = e$, or $r = e^A$, or A is the logarithm of r to the base or radix e. Then, referring to the above-mentioned value of A, we have log. $_e r$ (i.e., log. of r to the base e) $= r - 1 - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 -$, etc., or, as before, putting $1 + a$ for r, log. $_e(1 + a) = a - \frac{a^2}{2} + \frac{a^3}{3} -$, etc.; a series from which log. $_e(1 + a)$ cannot be found, unless a be fractional. However, if we put $-a$ for a, log. $_e(1 - a) = -a - \frac{a^2}{2} - \frac{a^3}{3} -$, etc.; and subtracting this expression from the former, log. $_e(1 + a)$ − log. $_e(1 - a)$ or log. $_e\left(\frac{1+a}{1-a}\right) = 2(a + \frac{a^3}{3} + \frac{a^5}{5} +$, etc.), and, for the sake of convenience, putting $\frac{u+1}{u}$ for $\frac{1+a}{1-a}$, in which case $a = \frac{1}{2u+1}$, we finally obtain log. $\frac{u+1}{e^u} = 2\left\{\frac{1}{2u+1} + \frac{1}{3(2u+1)^3} + \frac{1}{5(2u+1)^5} +, \text{ etc.}\right\}$, or log. $_e(u+1) = \text{log. } _e u + 2\left\{\frac{1}{2u+1} + \frac{1}{3(2u+1)^3} + \frac{1}{5(2u+1)^5} +, \text{ etc.}\right\}$. If 1 be put for u in this formula, the Napierian logarithm of 2 is at once obtained to any degree of accuracy required; if 2 be put for u, the Napierian logarithm of 3 can be calculated, etc. Now, as logarithms of any system have always the same ratio to one another as the corresponding logarithms of any other system, no matter what its base, if a number can be found which, when multiplied into the logarithm of a certain number to one base, gives the logarithm of the same number to another base, this multiplier will, when multiplied into *any* logarithm to the first base, produce the corresponding logarithm to the other base. The multiplier is called the modulus (q.v.), and, for the conversion of Napierian into common or Briggs's logarithms, is equal to ·4342944...; so that *to find the common logarithm of any number, first find the Napierian logarithm, and multiply it by* ·4342944...

As in Briggs's system the logarithm of 10 is 1·, and that of 100 is 2·, it follows that all numbers between 10 and 100 have, for their logarithms, unity + a proper fraction; in other words, the integer portion of the logarithms of all numbers of two figures is unity; similarly, the integer portion of the logarithms of numbers between 100 and 1000 is 2, and, in general, the integer portion of the logarithm of any number expresses a number less by unity than the number of figures in that number. This integer is called the *characteristic*, the decimal portion being designated as the *mantissa*.

As the logarithm of 1 = 0, the logarithms of quantities less than unity would naturally be negative; thus, the logarithm of $\frac{1}{2}$ would be—·30103, but, for convenience in working, the mantissa is kept always positive, and the negative sign only affects the characteristic; the logarithm of $\frac{1}{2}$ or ·5 would thus be $\bar{1}$·69897, the characteristic in this and similar cases expressing, when the fraction is reduced to a decimal, the number of places the first figure is removed from the decimal point; thus, the logarithm of ·0005 is $\bar{4}$·69897

Directions for the use of logarithms in calculation will be found prefixed to any set of tables. The history of the discovery is given in the preface to Dr. Hutton's Tables.

The tables most distinguished for accuracy are those of Callet (who edited Gardener's edition of *Sherwin's Tables*, making several additions and improvements), to seven places of decimals (Paris, 1821); Lalande, to five places (Paris, 1831); Hutton, to

seven places (1849), issued in a more convenient form, with improvements, by Messrs. W. & R. Chambers; the most accurate of all, however, are supposed to be those which Mr. Babbage produced with the aid of his ingenious calculating-machine.

LOGGIA, an Italian word signifying an open arcade, inclosing a passage or open apartment. It is a favorite class of building in Italy and other warm countries. The Loggia de' Lanzi at Florence is one of the finest examples extant; and the loggie of the Vatican, which are arcaded passages round the interior of the cortile of the palace, ornamented with beautiful paintings and arabesques by Raphael and his pupils, are well-known specimens.

LOGIC. This name denotes the science connected with the forms and methods of reasoning, and the establishment of truth by evidence. The science has come down to us from the Greeks, obtaining in great part the shape that we find it in from Aristotle, although he did not apply to it the name "logic." This name, signifying originally both thought and the expression of thought, must have been applied soon after the time of Aristotle. The most ancient name was "dialectic," meaning literally "conversation," "colloquy," or "dispute." (Hamilton's *Logic*, lect. 1.) "But it appears that Aristotle possessed no single term by which to designate the general science of which he was the principal author and finisher. *Analytic*, and *apodeictic* with *topic* (equivalent to *dialectic*, and including *sophistic*), were so many special names by which he denoted the particular parts or particular applications of logic."

The definition of logic has never been, till lately, a matter of serious controversy. There was formerly a substantial unanimity, with some variations in the form of the phraseology employed. We find it called usually the art of reasoning, or the science of reasoning, or both the one and the other. And by reasoning has been always understood *formal* reasoning; that is, inferences stated in such general language that they apply to all kinds of matter alike, as when in arithmetic we say three times four is twelve, without considering what the numbers are numbers of. A modification of this view has been adopted by sir W. Hamilton; he calls logic the "science of the laws of thought as thought." The introduction of the larger word "thought" is considered requisite, because "reasoning" is somewhat too limited, there being processes included in logic, and necessary to the establishment of truth, which that word does not cover; such, for example, are conception—the forming of general notions—and judgment, the statement of propositions (see JUDGMENT). But the word "thought" having an acceptation co-extensive with all intelligence, including memory, imagination, etc., as well as the operations concerned about truth, must be held to its narrower meaning, by which it simply includes the three great operations, constituting the distinct stages or divisions of logic, conception, judgment, and reasoning.

Mr. John Stuart Mill has propounded a radical innovation in the definition and province of this subject. According to him, logic "is the science of the operations of the understanding which are subservient to the estimation of evidence; both the process itself of proceeding from known truths to unknown, and all other intellectual operations in so far as auxiliary to this. It includes, therefore, the operation of naming; for language is an instrument of thought, as well as a means of communicating our thoughts. It includes also, definition and classification."

This definition has the merit of setting distinctly forth the *end* of the science, which is the essential point in every *practical* science, as logic is. That end is the *estimation of evidence;* in other words, it is not the ascertainment of *all* truth, but of those portions of truth that are authenticated by means of other truths, or by *inference*. The proper conduct of the operation of inferring one thing from another is the final end of the whole science. And in laying down the true criteria of inference, a certain amount of study has to be bestowed upon some of the operations of the human understanding, not to the extent of converting logic into a system of mental philosophy, but simply so far as will conduce to the purpose in view. It is not, therefore, the "laws of thought as thought," but the laws of thought as bearing upon the arts of inference, that Mr. Mill would esteem the matter of the science.

But inference is admitted on all hands to be of two kinds—deductive or formal inference, and inductive or real inference. In the one, no more is inferred than is already contained in the premises; for example, "All men are mortal, therefore the present generation of Englishmen will die," is a formal inference; the conclusion is within, or less than, the premises. This is the kind of inference treated of in the deductive or syllogistic logic, which was till lately the whole of the science. In the other kind of inference, a conclusion is drawn wider than the premises, so that there is a real advance upon our knowledge: from certain things directly ascertained we infer other things that have not been ascertained by direct experiment, and which, but for such inference, we should have had to determine in that manner. Thus, "This, that, and the other piece of matter, in which actual observations have been made, gravitates," therefore, "all inert matter, existing everywhere, known and unknown, gravitates," is an inductive inference. Of this last class of inferences, all the inductive sciences, including physics, chemistry, physiology, mental philosophy, etc., are made up. Accordingly, Mr. Mill treats this as coming within the province of logic, no less than the deductive, formal,

syllogistic, or necessary inference, which previous logicians had confined themselves to exclusively.

Sir W. Hamilton, in his system, admits the consideration of induction under what he terms "modified logic," in contradistinction to "pure logic," or formal inference; and it has not been unusual for writers on the science to devote a chapter to induction, after expounding the laws of the syllogism. But Mr. Mill has given to the inductive part the predominance over the other, as being the more fundamental, as well as practically the more important of the two. Making logic co-extensive with proof, he endeavors to show that the establishment of the *premises*, from which the formal logician takes his start, is, after all, the main point, and that the other is subsidiary and subordinate, although still important to be attended to, and susceptible of being well or ill done. He further shows that there are rules, or methods of procedure, which may be set forth and followed in the inductive operation; that mankind often break those rules from ignorance or inadvertence (as well as from other causes); and that good may be done by explicitly calling attention to them, and making them a branch of education, as the old logic has for a long time been. See INDUCTION, SYLLOGISM.

LOGIC (*ante*). Regarding the science as concerned directly only with the form and not the substance of reasoning, logic finds its starting point in human intuitions and thoughts, which, by the processes of conceiving, judging, and reasoning, produce, respectively, concepts, judgments, and arguments. These products, in turn, are expressed in language by terms, propositions, and syllogisms. It is with the division, definition, classification, and contradistinction of these, and more especially with the truth or fallacy of all conceivable syllogisms, that logic principally deals. Thus, concepts may be congruous or incongruous, may or may not be true, or valid, or distinct; judgments may be as to quantity, universal (all M is P) or particular (some M is P); as to quality, they may be affirmative (all M is P) or negative (no M is P), they may be categorical or conditional, true or not, and so on. Each judgment contains two concepts, which stand in the relation of subject and predicate and are connected by some verb of being; and it may be noted that predicables, or terms affirmable of others, are grouped in five classes, as they denote genus, species, difference, property, and accident. Either of these concepts is said to be distributed when it is taken as a whole, and undistributed when but part is taken. From the various attributes and varieties of the judgments and their elementary concepts are evolved rules as to opposition and distribution, such as: "The truth of a universal implies the truth of a negative," and "All universals distribute the predicate."

As concepts compose the judgments, so judgments or propositions compose the syllogism. For example, in this simple but complete syllogism: "All M is P; all S is M; hence, all S is P," the first proposition is called the major premise, the second the minor premise, and the third the conclusion. Now, it has already been seen that every proposition may be affirmative or negative and either universal or particular. We thus have the four primary propositions: universal affirmative, all S is P (A); universal negative, no S is P (E); particular affirmative, some S is P (I); particular negative, some S is not P (O), which in all works of logic are designated by the capitals A E I O, as above indicated. Combined in all possible ways to form syllogisms (three in each), we obtain 64 conceivable forms, of which only 11 are found to be sound when tested by the laws of distribution, and others which apply. These are called moods. Again, by changing the position of the middle term, each mood may be made to take four forms, which are termed figures. But of the 44 resulting syllogisms, only 19 can be proven true under the usual tests. To designate these, there has long been in use a set of otherwise meaningless words, often arranged in mnemonic Latin verses, in which the vowels represent the propositions and their order. These are as follows:

Fig. I. BA*rb*A*r*A, c*El*A*r*E*nt*, d*A*r I I, f*E*r*IO*que*, *prioris:*
II. CE*s*A*r*E, c*Am*E*str*E*s*, f*Est*InO, b*A*r*O*k*O, *secundæ:*
III. *Tertia* d*A*r*A*pt*I*, d*Is*A*mIs*, d*At*IsI, f*El*Apt*On*, B*O*k*A*rd*O*, f*E*r*Is*On habet: quarta insuper addit,*
IV. B*r*A*m*A*nt*Ip, c*Am*E*ns*E*s*, d*Im*A*r*Is, f*EsApO, *fr*EsIs*On*.

Ferio, for instance, stands for the syllogism E I O, as: "No M is P; some S is M; hence, some S is not P." The syllogisms of the last three figures may all be reduced to the form of the first for convenience in applying tests. One of the most interesting discussions connected with the science of logic arose from the proposition of sir William Hamilton to substitute for these 19 universally accepted syllogisms, others arising from the fact that any affirmative proposition may or may not have its subject, and any negative proposition its predicate, distributed. This would give eight propositions instead of four, and entirely overthrow the old method. Most modern treatises expound Hamilton's theory and notation, but the system descended from Aristotle is more easily understood and applied.

Syllogisms may be hypothetical, disjunctive (as: S is either P or Q; but S is P; *ergo*, S is not Q), or dilemmatic, a combination of the two. Sometimes one proposition does not appear, forming the enthymeme; and again, several syllogisms may be linked together,

the whole being termed the chain or sorites. Still another form is the epichirema, where the reason for each premise is given with it.

Fallacies are errors resulting from the improper use of words or mental processes in argument. They are variously classified. Among the most important are: generalization, or the attributing to a class individual limitations, as "S is a clergyman and a hypocrite—*ergo*, all clergymen are hypocrites;" equivocation, where a word is used in two senses; the *non vera pro vera*, where a premise is false; accident, where an accidental property is made to appear as a substantial attribute. For others and a more complete treatment of the subject, see FALLACY. An ancient Greek fallacy, which appears perennially as a modern joke, is the case of a man who says, "I lie." Does he lie or not? If he lie, he tells the truth; if he speak truly, he lies.

The study of formal logic in the monastic schools and universities of the middle ages was carried to an extent more recondite than profitable, the result being a not unmerited contempt for the science as then limited by the scholastic method. A classification and discussion of syllogisms in which no attention is given to the origin of the concepts which form the premises or to the process of induction, resembles rather a series of mathematical permutations than fruitful intellectual investigation. In fact, in our day, prof. Jevons has constructed what he calls a logical machine, which will perform many of the operations of syllogistic reasoning. In modern times the study has been in a measure reinstated; but it has been through the enlargement of the ground allotted it and the installment of induction as a most important factor. Thus widened in its scope, there may be derived from it laws of reasoning of the greatest value as forming the basis of all investigation in physical, philosophical, and moral science.

Among numerous authors who may be consulted on this topic are, besides Hamilton and Mill, archbishop Whately, Wallace, Jeremy Bentham (essays), William Stanley Jevons; and of American writers, profs. Bowen of Harvard, Wilson of Cornell, and Schuyler of Baldwin.

LO'GOGRAM (Gr. *logos*, a word, and *gramma*, a letter) is simply a complicated or multiplied form of the anagram (q.v.), where the puzzle-monger, instead of contenting himself with the formation of a single new word or sentence out of the old, by the transposition of the letters, racks his brain to discover all the words that may be extracted from the whole or from any portion of the letters, and throws the whole into a series of verses in which synonymic expressions for these words must be used. The puzzle lies in ascertaining what the concealed words are, and, through them, what is the primary word out of which they have all been extracted. A specimen is given in Henry B. Wheatley's book on *Anagrams* (1862), in which, out of the word "curtains," no less than 93 smaller ones are framed.

LOGOGRAPHERS, the name by which the Greeks designated their historians previous to Herodotus. The logographers described in prose the mythological subjects and traditions which had been treated of by the epic poets, supplementing them by traditions derived from other quarters, so as to form, at least in appearance, a connected history; their works, however, seeming to be intended rather to amuse their readers than to impart accurate historical knowledge. The term was also applied to those orators who composed judicial speeches or pleadings, and sold them to those who required them.

LOGOMA'NIA, or DISEASE OF THE FACULTY OF LANGUAGE. It frequently happens that, while the idea is clear and distinct, all trace of its representative sound has disappeared; or another sign, or one conveying the converse of what is intended, is used. Such a condition is often associated with organic disease of the nervous structure, as in paralytics. In certain cases, there is an irresistible rapidity of utterance, or, apparently, an involuntary utterance of certain words or phrases foreign to the character of the individual. In another class of cases, memory appears to be chiefly at fault; there may be the oblivion or all words; the forgetfulness of certain classes of words, such as substantives, while others are recollected and correctly applied; the forgetfulness of particular words, as of the individual's own name; or of parts of words, as occurs in general paralysis, where the last or penultimate syllable escapes attention, and is generally omitted; or there may be confusion as to orthography, and this has been observed when limited to a single letter. Dr. Graves, Dublin, mentions a farmer who retained a knowledge of all parts of speech except nouns and proper names; but even of these he recollected the initial letter: he carried a pocket-dictionary, and when about to use such words as "Cow" or "Dublin," turned to the letters "C" and "D," and then recalled what he wished. Patients are found who impose upon themselves a mutism as to certain phrases, and limit their vocabulary to particular expressions. In others, there is invariably a transposition of words; such as when, in place of saying, "the rose is beautiful," a paralytic recasts the sentence, "beautiful rose is," and all other sentences in a similar fashion. Fever, in Mezzofanti, is said to have swept away in an hour, his vast acquisitions in 60 languages; in other cases, it has recalled dialects forgotten for half a century; and mere excitement seems capable of inventing or inspiring a vast number of sounds assuming the aspect, and even the relations of a language so closely as to suggest doubts as to whether they are creations such as those of Psalmanazar, which deceived the linguists of the royal society, or those ebullitions of devotional feeling designated

"unknown tongues." In other forms of disease, the cries of animals or natural signs are resorted to in place of words; or the ordinary language is sung or chanted, or used rhythmically; or a foreign language may be employed or imitated. The bearing of such alterations upon the philosophy of mind, and upon any theory as to the origin of language, must be obvious; but they possess a still more intimate connection with the amount of intelligence and responsibility predicable in every case of disease of the nervous system.—Calmiel, *De la Paralysie considerée chez les Aliénés; Phrenological Journal*, No. 47; Coleridge, *Biographia Literaria*, vol. i. p. 112.

LO'GOS (Gr. from *lego*, "I speak") denotes the act of speaking; that which is spoken; the natural process gone through for the purpose of the formation of speech; the reasoning powers themselves—all the attributes and operations of the soul, in fact, as manifested by the spoken word. It thus occurs in the classical writers under the manifold significations of word or words, conversation, oration, exposition, command, history, prose, eloquence, philsophical proposition, system, reason, thought, wisdom, and the like. Theologically, the word logos, as occurring at the beginning of the gospel of St. John, was early taken to refer to the "second person of the Trinity, i.e., Christ." Yet what was the precise meaning of the apostle, who alone makes use of the term in a manner which allows of a like interpretation, and only in the introductory part of his gospel; whether he adopted the symbolizing usage in which it was employed by the various schools of his day; which of their widely differing significations he had in view, or whether he intended to convey a meaning quite peculiar to himself:—these are some of the innumerable questions to which the word has given rise in divinity, and which, though most fiercely discussed ever since the first days of Christianity, are far from having found a satisfactory solution up to this moment. The fact, however, is, that the notion of a certain manifestation or revelation out of the center of the Godhead, as it were—which manifestation, as a more or less personified part of the deity, stands between the realms of the infinite and the finite, of spirit and matter—has from times immemorial been the common property of the whole east, and is found expressed in the religions of the primitive Egyptians, as well as in those of the Hindus and Parsees. This notion of an embodiment of divinity, as "*word*" or "*wisdom*," found its way, chiefly from the time of the Babylonian exile, into the heart of Judaism, which in vain endeavored to reconcile it with the fundamental idea of the divine unity. The apocryphal writers chiefly pointed to the "wisdom"—of which Solomon (Prov. viii. 22) says that it had dwelt with God from the beginning, and Job (xxviii. 20), that it had assisted in the creation—as *the* emanation of God, which emanation was supposed to be bodily to a certain, however minute, degree. Thus, Sirach (xxiv. 1, 23) understands the "spirit of God" (Gen. i. 2) to be a kind of veil or mist, and speaks (i. 1, 9) of the "wisdom that is of the Lord and is with the Lord, everlasting," and that "it was *created* before all things, and known unto him" (ib.).

This *wisdom*, or *word* of creation, which, according to Sirach's view, formed and developed the chaos, further manifested itself—visibly—by a direct and immediate influence upon one select people, Israel, through which it wished further to influence all mankind. A nearer acquaintance with this doctrine in all its bearings at once solves the old riddle of certain Targumic interpretations, which have puzzled a host of investigators. Thus, versions like that of Targum Jerushalmi to Gen. i. 1, "with *wisdom*, God created heaven and earth," and the constant use of the term *Memra* (word) instead of *God* or *Jehovah*, become clear at once (see TARGUM, VERSIONS). No less must many passages in the Talmud and Midrash assume an entirely different aspect, if that prevalent mode of thought and speech is taken into consideration.

In the earlier Platonic schools, again, Logos, scil., of God, was the common term for "plan of the cosmos" or "divine reason," inherent in the deity. The later schools, however, more prone to symbol and allegory in philosophical matters, called Logos a "hypostasis of divinity," a substance, a divine corporeal essence, as it were, which became outwardly visible—a separate being, in fact, which, created out of the Creator, became "the Son of the Creator."

But above all, we have, for the proper consideration of the usage in the days of the apostles, to examine the Judæo-Alexandrian views on this point. Philo, who is their best representative, makes the Logos the all-comprising essence of spiritual powers (daimons, angels), which alone acts upon the universe. In this sense, the Logos stands as the *divine reason*, the *power of all powers*, the *spirit of God*, and his *representative*, between him and all else. Nay, he goes so far as to call it the *archangel*, who executes the behests of God to man; the *high-priest*, who prays for man, and interferes on his behalf, before the throne of the Almighty; and he finally speaks of Logos as "the second God" (*De Somn.* i. 655), and the "providence" (fate, fortune) which watches over the destinies of mankind and separate nations (*Quod Deus*, i. 298). These conceptions, which, he says, came to him in a trance, he does not allow, however, to be in the least derogatory to the strictest belief in the oneness, invisibility, and pure spiritualness of God, such as it is taught in the Jewish creed.—This characterizes sufficiently the general vagueness and haziness of philosophical and theological parlance and speculation in the Alexandrine schools, which, obviously unconscious of the palpable con-

traditions uttered in one breath, mixed up pure thought and visions, Scripture with eastern and western philosophy and theosophy, monotheism and polytheism, heaping systems upon systems, and dreams upon dreams.

If the apostle did not himself, to a certain degree, stand under the influence of some of the popular ideas connected with the term under consideration, it would, at any rate, seem most natural that he made use of it, as of one conveying a certain vague, yet commonly recognized transcendental notion of a divine emanation to the minds of his contemporaries. This opinion, however, is far from being unanimously adopted. Thus, some investigators hold that John, irrespective of the parlance of his day, used the word logos for *Legomenos*, i.e., he of whom it has been spoken, the promised one; others identify it with "doctrine;" while a third notion (held among others by Calvin and Luther) would make it equal to monologue, conversation.

For the person of the Logos as the mediator (Æon, Demiurgos, etc.), and the respective relation between him and the other persons of the divine trias, we must refer to the articles CHRIST, GNOSTICS, TRINITY.

LOGRO'ÑO, one of the six modern provinces which form the ancient province of Castilla la Vieja in Spain; 1945 sq.m.; pop. 182,941. It extends along the right bank of the Ebro, and includes portions of territory which formerly belonged to the provinces of Burgos and Soria. It is a productive region, rich in wine and corn, fruits and vegetables. Minerals also abound, and there are valuable mineral springs. Near the city of Logroño, a few miles s. of the Ebro, was fought, April 3, 1367, a desperate battle between Henry, count of Trastamara, elevated to the throne of Castile by the people of that country, and Edward the black prince, who had formed an alliance with the detestable Charles II., king of Navarre, surnamed "the wicked," to replace Pedro the cruel on the throne of Castile, from which he had been driven on account of his many enormities. This battle was decisive, and resulted in returning to Pedro his throne.

LOGRO'NO (Lat. *Julia Briga*), a t. of Spain, capital of the province of Logroño, is situated on the Ebro, 60 m. e. of Burgos. It is surrounded by walls, has several churches, convents, a theater, college, some manufactures, and a good trade in rural produce. Pop. 11,257.

LOGWOOD, the dark red solid heart-wood of *hæmatoxylon campechianum*, a tree of the natural order *leguminosæ*, sub-order *cæsalpineæ*. This tree grows in Mexico and Central America, and is perhaps a native of some of the West India islands; but is said to have been introduced into Jamaica in the beginning of the 18th c., although it is now naturalized there. It is the only known species of its genus. It grows to a height of 20 to 50 ft.; the leaves are pari-pinnate; the racemes many-flowered, and longer than the leaves. The sapwood is yellowish, and being worthless, is hewed off with the bark. The heart-wood is heavier than water, close-grained, but rather coarse. It has a slight smell resembling that of violets, a sweetish taste, is astringent, and contains a distinguishing crystalline principle, called *hæmatoxyline* (q.v.).

No dye-wood is imported in such large quantities as logwood; nearly 50,000 tons are annually sent to Great Britain. It was first introduced in the reign of queen Elizabeth, but the color was found to wash out, and the dyers not knowing how to fix it, much dissatisfaction was occasioned by the sale of cloths dyed with it, and an act of parliament was passed prohibiting its use. This act was repealed in 1661, since which time it has been constantly in use, science having shown means for fixing. Logwood is imported in large billets or logs, usually about 4 ft. in length, 18 in. in diameter, and of very irregular shape; the larger they are the greater their value; the color is a dark blood-red, becoming almost black after long exposure. The infusion of the wood is also blood-red, which color it yields readily to boiling water; it is changed to light red by acids, and to dark purple by alkalies. In dyeing with logwood, an alum mordant gives various shades of purple and violet—with the solution of tin, it gives violet, red, and lilac; with the sulphate or acetate of iron, it gives a black; but this is greatly improved in depth and softness, if gall-nuts are also used, which is generally the case. It is also one of the ingredients in both black and red ink; but Brazil-wood is usually preferred for the latter.

LÖHER, FRANZ VON; b. Paderborn, Germany, 1818; after studying at several German universities, traveled in Europe and visited Canada and the United States in 1846–47, and in 1849 established the *Westfälische Zeitung* at Paderborn. For political agitation he was imprisoned by the Prussian government, but was acquitted by the court. In 1853 he was professor at the university of Göttingen, and in 1855 in the university of Munich, and secretary of the academy. His works are *Des Deutschen Volkes Bedeutung in der Weltgeschichte; Geschichte und Zustände der Deutschen in Amerika;* the epic poem *General Spork; Land und Leute der alten und neuen Welt; Jacobäa von Bayern; Aus Natur und Geschichte vom Elsass-Lothringen.*

LOIGNY, BATTLE OF, Dec. 2, 1870, the Germans, under the grand-duke of Mecklenburg, winning a signal victory over the French, led by gen. Chanzy. The Germans lost in killed and wounded 3,000 men, the French nearly twice this number, besides 3,000

prisoners and 7 guns. Loigny, the site of the battle, is a hamlet of France, in Eure-et-Loir, 30 m. s.s.e. of Chartres.

LOIR, a small river of France, having its source s.w. of Paris, and running thence in a generally s.w. course to its junction with the Sarthe, a tributary of the Loire. Length about 200 miles. Navigable by means of 39 locks a distance of about 70 miles.

LOIRE (ancient *Liger*), the longest river in France, has its source in the Cevennes mountains, near Gerbier-des-Joncs, in the department of Ardèche, at an elevation of 4,550 ft., flows in a n.n.w. direction through the center of France as far as Orleans, where it bends round to the s.w. as far as Tours, and thence follows, in general, a western course to its embouchure in the bay of Biscay. Entire length, 612 miles. It becomes navigable a little above Roanne, at a distance from the sea of 450 miles. At one time, the depth of the water at its mouth was 18 ft. at ebb-tide; now it is only from 6 to 9 feet. The lower course of the Loire is adorned by wooded islets. In the lower part of its course, large dikes or *levées* have been built, to protect the surrounding country from inundations, from which, however, they sometimes suffer terribly. It receives about 40 affluents, of which the principal are the Loir, on the right; and the Allier, the Cher, the Indre, and the Vienne, on the left.

LOIRE, a department in the s.e. of France, formerly part of the province of Lyonnais, comprises the arrondissements of Montbrison, Roanne, and St. Etienne. Area, 1,178,234 English acres; pop. '76, 590,613. The basin of the Loire, which flows through this department, is a rather unfruitful valley, but the mountains are rich in iron and lead, and the coal-fields of the departmeut are the richest in France. Loire is also noted for the rearing of silk-worms, and for the excellence of its silk manufactures. The weaving of hemp and linen is also largely carried on. Its mineral springs are in great repute, especially those of St. Alban, Sail-sous-Couzan, and St. Galmier. The chief towns are St. Etienne, Roanne, Rive-de-Gier, and Montbrison.

LOIRE, HAUTE, a central department of France, bounded on the s. by the departments of Lozere and Ardèche. Area, 1,212,160 sq. acres; pop. '76, 313,721. The surface is mountainous; covered by the Cevennes, the Cantal mountains, and the Margaride chain, whose slopes are clothed with forests, and whose peaks are during about half the year covered with snow. Chief rivers, the Loire and the Allier. The soil of the plains is fertile, and the agricultural produce of the soil consisting of the usual crops with fruits is abundant. The climate is very various, owing to the irregularity of the surface. The arrondissements are Le-Puy, Yssengeaux, and Brioude; the capital, Le-Puy.

LOIRE-INFÉRIEURE, a maritime department in the w. of France, formed out of the southern portion of the old province of Brittany, and comprising the arrondissements of Nantes, Ancenis, Paimbœuf, Châteaubriant, and Savenay, lies on both sides of the river Loire. Area, 1,697,979 English acres; pop. '76, 612,972. In the s. of the department lies Grand-Lieu, the largest lake in France. The interior is, on the whole, flat, but the n.e. and s.e. are slightly hilly. The soil is fertile, producing wheat, rye, and barley, and forming in some parts rich pasturage. There are also some fine forests. Salt marshes are numerous in the west. The vineyards yield annually about 32,000,000 gallons of wine. Ship-building is carried on extensively at Nantes. The coast-fisheries and general export trade of the department are extensive. Capital, Nantes; none of the other towns are large.

LOIRET, a central department of France, formed out of the eastern portion of the old province of Orleannois, and comprising the arrondissements of Orleans, Montargis, Gien, and Pithiviers, lies on both sides of the river Loire. Area, 1,670,984 English acres; pop. '76, 360,903. The country is, for the most part, an elevated and fruitful plain, abounding in corn and wine—known as the plateau of Orleans; but the district along both banks of the Loire, called the *Sologne*, is a barren, sandy tract. Loiret contains several large forests. Cattle, sheep, and bees are extensively reared, and mineral springs are numerous.

LOIR-ET-CHER, a department of France, lying on both sides of the river Loire, and formed of part of the old province of Orleannois, comprises the arrondissements of Blois, Vendôme, and Romorantin. Area, 1,568,677 sq. acres; pop. '76, 272,634. The department is almost a uniform plain, broken only by vine-hills of trifling elevation. The northern part is more fertile than the south, three-fourths of which is occupied by marshes, heaths, and forests—the last of which, indeed, cover one-sixth of the entire surface. The chief products are corn, fruits, hemp, wine, and vegetables of all sorts. The rearing of sheep, poultry, and bees is carefully attended to, and there are also manufactures of woolens, cottons, leather, glass, etc. Principal towns, Blois, Romorantin, and Vendôme.

LO'JA, a t. of Spain, in the province of Granada, is situated on the slope of a hill near the left bank of the Xenil, 31 m. w. of Granada, and 41 n.n.e. of Malaga. Pop. 15,500. Loja is a thriving place, with 21 woolen factories, 3 paper-mills, and two hospitals, and was once of great military importance, being the key to Granada. The

summit of the slope on which the town is built is crowned with the ruins of a Moorish castle.

LOJA, a city of Ecuador in South America near the Andes, lat. 4° s.; pop. 12,000. It is the center of a great commerce in quinine. The surrounding country is elevated so far above the sea that grains of the temperate zone are produced as well as the fruits of the tropics. Manufactures of wool, cotton, and carpets are among the chief industries of the city.

LO'KEREN, a t. of Belgium, province of East Flanders, on the Durme, 12 m. e.n.e. of Ghent. It is a station on the Ghent and Antwerp railway. Pop. in '76, 17,400. Lokeren is a well-built town, with numerous schools, benevolent institutions, important manufactures of linen, cotton, and woolen goods, and large bleach-fields.

LOKI, a demi-god in the Scandinavian mythology. He did not belong to the race of the Aesir (see ASES), but to an older dynasty. Still, we find him from the very first on terms of intimacy with Odin, and received among the Aesir. His appearance is beautiful, and he is possessed of great knowledge and cunning. He often brings the new gods into difficulties, from which, however, he again extricates them. Hence he is to be regarded as the principle of strife and disturbance in the Scandinavian mythology; the "spirit of evil," as it were, mingling freely with, yet essentially opposed to, the other inhabitants of the Norse heaven, very much like the Satan of the book of Job. By his artful malice, he caused the death of Balder (q.v.), and was in consequence visited by the Aesir with most terrible punishments. He is sometimes called Asa-Loki, to distinguish him from *Utgarda-Loki*, a king of the giants, whose kingdom lies on the uttermost bounds of the earth; but these two are occasionally confounded. It is quite natural, considering the character of Loki, that at a later period he should have become identified with the devil of Christianity, who is called in Norway to the present day, *Laake*.

LOKMÂN (ABU AMAN?), a fabulous personage; the supposed author of a certain number of Arabic fables. He is by some Arabic writers called a nephew of Job or Abraham; by others a councilor of David or Solomon; others again identify him with Balaam, whose name signifies, like that of Lokmân, the *Devourer*. Equal uncertainty reigns respecting his native place and occupation. Thus, he is variously held to have been an Ethiopian slave, conspicuous for his ugliness, a king of Yemen, an Arabic tailor, a carpenter, a shepherd, and the like. Most probably, the circumstances and sayings of several men living at different periods have been fathered upon Lokmân, of whom Mohammed (Surah 31) says that to him "has been given *the wisdom*." There is also a great likeness to be recognized between himself and his fables and Æsop and those current under the latter's name. According to the Arabic writers, to Lokmân, as the ideal of wisdom, the kingdom of the world was offered, but was by him declined—provided this was no offense against piety—because he felt much happier as he was; and that when asked what was the secret of the goodness and wisdom of all his deeds, he replied: "It is this: I always adhere to the truth; I always keep my word; and I never mix myself up with other people's affairs."

The fables that go by Lokmân's name are for the most part Indian apologues, which were first rendered into Greek, thence into Syriac, and finally into Arabic. They are, in this last form, of a comparatively recent date, and thus unknown to all the classical writers. The language is very corrupt, and it is highly to be regretted that the book, for want of anything better, still holds its rank as an elementary book for Arabic students. Its first redaction is, according to a note to a manuscript in the imperial library in Paris (Suppl. No. 58), due to an Egyptian Christian, Barsuma, who probably lived towards the end of the 13th century. The first edition, with a Latin translation by Erpemius, appeared at Leyden (1615). The book has been frequently translated into European languages—into French, by Tanneguy, Schier, etc.; into Spanish, by Miguel Garcia Ascensio, etc.; into Danish, by Rask; into German, by Olearius, Schaller, etc. Recent editions are by Bernstein (Gött. 1817), Caussin de Perceval (Paris, 1818), Freytag (Bonn, 1823), Rödiger (Leip. 1830, etc.), Schier (Dres. 1831), Rasch (Copenh. 1832), Derenburg (Berl. 1850), etc.

A book, *Amthâl* (Parables), ascribed to Lokmân, and supposed to contain more than a thousand apologues, maxims, parables, sentences, etc., has never been discovered. Lokmân's supposed grave is shown at Ramlah, near Jerusalem.

LOLA MONTEZ (MARIA DOLORES PORRIS), Countess of Landsfelt, 1824–61; alleged by Mirecourt, author of *Les Contemporaines*, to have been born in Montrose, Scotland, though she claimed Seville, Spain, as her birthplace. When quite young she married capt. James of the East India service against the wish of her mother, and traveled with him in India. She also accompanied him during an expedition against the Afghans. About 1838 she obtained a separation from her husband, and traveled in Europe, leading an erratic life in the different capitals, at one time singing barcaroles in the streets of Warsaw, and again appearing as a danseuse in the theater of that city. She now adopted the stage as a profession, appearing usually as a dancer, and, though possessing little skill in that direction, achieved a certain degree of popularity by her graceful person and charming vivacity of manner. In 1847 she visited Munich, and there attracted the atten-

tion of king Louis of Bavaria. She was at this time very attractive, handsome, and with a remarkable talent for political intrigue. The king gave her a residence in Munich and an income estimated at $25,000 per annum, and made her the confidant of his political schemes. She soon exercised a powerful influence, and, as is believed, for the interest of Bavaria. But she made many enemies, the Jesuits, as she averred, being active against her. A difficulty with the students of the university of Munich at length precipitated her downfall, and the king was forced by his counselors to consent to her arrest and deportation from the country. This act was followed by the abdication of the king himself, who afterwards vainly sought to renew his association with Lola Montez, who absolutely rejected his advances. During her stay in Munich, she was named by the king countess of Landsfelt, with the consent of the crown prince. Lola now visited England, and in 1849 was married to George Stafford Heald, esq., of the 2d life-guards, a gentleman of family and position, with an income of £6,000 per annum. His family opposed the match, and on Aug. 6, 1849, through their instigation, she was brought before a London police court on a charge of bigamy; her former husband, capt. James, being still living in India. Her defense (of a divorce) was not accepted, the law prohibiting either party from marrying again during the life-time of the other; Heald accordingly obtained a divorce, and Lola continued to lead her former wandering life. She sailed for New York in the autumn of 1851, on board the same steamer with Louis Kossuth, arriving on Dec. 5. She appeared at the Broadway theater in a piece called *Lola Montez in Bavaria*, and as a danseuse in most of the large cities. In 1855 she took a company of players to Australia, and gave some of her characteristic performances in the principal towns. In 1858 she delivered a lecture on *Beautiful Women* in New York. The last few years of her life were passed in retirement.

LOLIGO, or SQUID. See CALAMARY, *ante*.

LOLIUM. See DARNEL and RYE-GRASS.

LOL'LARDS, or LOLL'HARDS, a semi-monastic society, the members of which devoted themselves to the care of the sick and of the dead. It was first formed about the year 1300 in Antwerp, where some pious persons associated themselves for the burial of the dead. They were called from their frugal life, and the poverty of their appearance, *Matemans;* also, from their patron saint, *brethren of St. Alexius;* and, on account of their dwelling in cells, *Fratres Cellitæ;* whilst they acquired the name Lollards from their practice of singing dirges at funerals—the Low-German *lollen*, or *lullen*, signifying to sing softly or slowly. They soon spread through the Netherlands and Germany, and in the frequent pestilences of that period were useful and everywhere welcome. The clergy and the begging-friars, however, disliked and persecuted them, classing them with the heretical *Beghards* (see BEGUINES), till Gregory XI. took them under his protection in 1374. Female Lollard societies were formed in some places. The Lollards having been reproached with heresy, their name was afterwards very commonly given to different classes of religionists, sometimes to the truly pious, sometimes to the worst pretenders; and in England it became a designation of the followers of Wycliffe (q.v.), and thus extended into Scotland, where the *Lollards of Kyle* (in Ayrshire) attracted attention, and became the objects of persecution in the end of the 15th century.

LOLLARDS (*ante*), a name at first, about the beginning of the 14th c., applied to the Cellites, who, at Antwerp, devoted themselves to the care of persons ill with pestilential diseases; and afterwards, during the close of that century and through the next, given to the followers of Wycliffe. Various explanations of the name have been suggested, one of which, favored by many, is that derived from the Low-German word *lullen*, or *lollen*, which means to sing low or softly; it was applied to the Cellites because they sang low and plaintively at funerals. A later and more probable theory derives it from *lollardus*, the Latin form of the old English "loller," one who lolls or lounges about, a vagabond. It was applied at first both to the begging-friars and to the Wycliffites; but afterwards being restricted to the latter, it occasioned, by its resemblance to the Latin "lolia," the punning accusation that they were tares among the wheat. Many of them, sent forth by Wycliffe to carry the gospel into the remote villages, were called "poor priests" by the people, to large numbers of whom they preached in the fields, churchyards, and market-places.

After Wycliffe had taken the degree of D.D. at the university of Oxford, and had commenced there his earnest appeals against papal errors, he aroused the hatred of the bishops, and became prominent as an advocate and leader of reform. When he retired from the university to the little parish of Lutterworth, the work went on with unabated power. Those who had been instructed by either his preaching or writings were active in diffusing his doctrines abroad. His followers were found among all classes of people; some of the more distinguished being influenced somewhat perhaps by political motives, but the greater part chiefly by the power of religious truth. The judicial examinations of those who, in the next age, were arrested for heresy show that they all cherished, substantially, the doctrinal views which Wycliffe had taught. The principal of these views were: the supreme authority of the Scriptures as the rule of faith; the finished work of Christ as the only Savior; and the denial of transubstantiation, auricular confession, image worship, the papal hierarchy, and the priestly offices in the mass. At the time

of Wycliffe's death the number of his followers was increasing rapidly, as was indicated by the somewhat extravagant affirmation of Knighton that nearly every second man in England was a Lollard. In 1382 a council, convened by archbishop Courtney, condemned 10 of Wycliffe's articles as heretical and 24 as erroneous. The archbishop published an order forbidding any man, of any estate or condition whatsoever, to hold, teach, preach, or defend the aforesaid heresies and errors, or any of them, or even allow them to be preached or favored either publicly or privately. Bishops and priests were exhorted to become inquisitors of heretical pravity, and were threatened with excommunication if they neglected their duty in this respect. The chancellor of the university, charged with "being somewhat inclined to the errors aforesaid," was enjoined to allow no one under his jurisdiction to teach or defend them. At length, violent persecution was commenced. Some of the accused recanted, and became bitter persecutors of their former friends. Others fled out of the country. In other parts, also, of the kingdom the Lollards were actively teaching their doctrines. In Leicester and the vicinity they made great progress; and as the people hid their teachers, the whole city and all its churches were placed under interdict until all the Lollards of the town should forsake their heresy and obtain absolution. To arrest their advance and break up their meetings, parliament resolved that if any persons, on conviction, refused to abjure their errors, they should be delivered over to the secular arm to be burned. William Sautre, "a good man and faithful priest, inflamed with zeal for true religion," was condemned and committed to the flames in an open part of London. The "cruel constitution" of archbishop Arundel forbade any one to preach in English, either within the church or without, except by permission of the bishop. Schoolmasters and teachers were forbidden to teach anything contrary to what the church had declared. No book or treatise of Wycliffe was to be read anywhere. No person was allowed to write or print a translation of any text of Scripture into English or any other language. No one was to dispute upon articles determined by the church. No scholar or inhabitant of Oxford university was to propose or defend anything contrary to the determinations of the church.

But all these measures proving insufficient to suppress the hated opinions, the active persecution also went on, and many persons were burned. The accession of Henry V. was signalized by his surrendering to the persecutors his friend sir John Oldcastle, who was arrested, condemned, and excommunicated. At first he contrived to escape from prison, but was rearrested, and in 1417 was burned at the stake. The parliament further enacted "that whatsoever they were who should read the Scriptures in the mother tongue, they should forfeit land, cattle, body, life, and goods from their heirs forever; and so be condemned for heretics to God, enemies to the crown, and most arrant traitors to the land." In case of relapse after pardon, they were to be hanged as traitors against the king, and then burned as heretics against God. The last executions took place in 1431.

In Scotland, also, especially in the western districts, the Lollards were numerous, and suffered persecutions during different parts of the 15th century. Near the close of it 30 persons were summoned before king James IV. and the great council. Happily for them the king refused to sanction their condemnation, and they were released. After the opening of the 16th c. the Lollards gradually became incorporated with the reformed churches.

LOLL BAZAAR, an inconsiderable t. of northern India, in the district of Cush Behar, between the rivers Durlah and Tista, in n. lat. 26° 4′, and e. long. 89° 18′. It partly occupies the site of the ruined city of Komotapur, a "most stupendous monument of rude labor," the walls of which were 19 m. in circumference in the inside of the inner ditch. Massive ruins are still to be seen.

LOMBARD, PETER (rather, Peter the Lombard), one of the most famous of the schoolmen, was b. at a village near Novara, in Lombardy. He was a pupil of Abelard, afterwards became a teacher of theology in Paris, and in 1159 was appointed bishop of Paris. Bayle says that he was the first who obtained the title of doctor of theology in the university of Paris. He died at Paris in 1164. He was very generally styled *magister sententiarum*, or the *master of sentences*, from his work *Sententiarum Libri IV.*, an arranged collection of sentences from Augustine and other fathers, on points of Christian doctrine, with objections and replies, also collected from authors of repute. It was intended as a manual for the scholastic disputants of his age, and as may be inferred from what has just been said, is a compilation rather than an original work. It was the subject of many commentaries down to the time of the reformation. The works of Peter Lombard were edited by Aleaume (Louvain, 1546).

LOMBARD ARCHITECTURE is the style which was invented and used by the Gothic invaders and colonists of the n. of Italy, from about the age of Charlemagne till it was superseded by the importation of the pointed style from France in the beginning of the 13th century. The architecture of the Lombards was derived from the Romanesque (q.v.), or debased Roman style which they found in the country—the general plan of the churches, and the general form of the pillars, arches, etc., being almost identical with that of the Roman basilicas (q.v.). But in detail there is no such resemblance; the

Roman traditions are entirely abandoned, and instead of the debased acanthus leaves and fragments of entablatures, so characteristic of the Romanesque style, the Lombards adopted a freer imitation of natural forms in their foliage, and covered their buildings with representations of the fights and hunting-expeditions in which they delighted. On their first arrival in Italy they used Italian workmen; but when their own people became more numerous they also laid aside the sword for the trowel. Accordingly, wherever in n. Italy the Lombards were numerous, their style prevailed; and where the Romans predominated, the Romanesque prevailed. The n. of Italy belonged naturally, at the time of Charlemagne, to the great German empire, and thus we find nearly the same style of architecture in Lombardy and in Germany as far n. as the Baltic. See RHENISH ARCHITECTURE. Few early examples of Lombard architecture exist. In the unruly times when the style originated, the buildings were no doubt frequently destroyed by fire; this seems to have led to the desire to erect fireproof structures, and thus the earlier as well as almost all the later examples are vaulted with stone, whereas the Romanesque basilicas are generally roofed with wood. This stone roof seems to have been the great desideratum in the new style. The earliest example is a small chapel at Friuli, built probably during the 8th c., and it is covered with an intersecting vault. Examples of this date are rare in Italy; but in Switzerland, where the style is almost identical, several interesting specimens of early architecture remain, such as the churches of Romain-Motier, Granson, Payerne, etc., in which the transition from the Romanesque to the round-arched Gothic is very clearly traceable. We there find the peculiar arch-ornament so characteristic of Lombardy and the Rhine, and we can trace the timid steps by which the Goths advanced in the art of vaulting.

The vaulting is the leading feature of Lombard architecture, and from it spring the other distinguishing forms of the style. Thus, the plain, round pillars, with a simple base and capital, which served to support the side-walls and roof of a basilica, are changed for a compound pier, made up of several shafts, each resting on its own base, and each provided with a capital to carry the particular part of the vaulting assigned to it. This change is deserving of particular notice as the first germ of that principle which was afterwards developed into the Gothic style (q.v.). Buttresses are also introduced for the first time, although with small projection.

The *cathedral* of Novara is one of the most striking examples of Lombard architecture. It belongs to the 11th century. It is derived from the old basilican type, having at the w. end an open atrium, with arcade around, from which the church is entered by a central door. The interior is divided into central and side aisles, with vaulted roof, and terminated with an apsidal choir. At the end of the atrium opposite the church, is situated the baptistery. At Asti there is an interesting example of the early Lombard baptistery. The same general arrangement of plan afterwards became common in the German churches, the atrium being roofed over and included in the nave, and the baptistery forming the western apse of the double-apsed churches. The elevation of Novara is ornamented with those arcades and arched string-courses so common in Lombard and Rhenish architecture.

San Michele at Pavia and San Ambrogio at Milan are also good early examples of this style. In both, the grouping of the piers into vaulting shafts, wall-arch shafts, etc., is complete, and that beautiful feature of the style, the arcade round the apse, is fully developed. The atrium and w. front of San Ambrogio form one of the finest groups of Lombard architecture.

Lombard architecture is important as forming a link between the Romanesque of Italy and the Gothic of the Cisalpine countries. On the one hand, its origin can be traced back to the Roman basilicas; while on the other it embodied those principles from the development of which sprang the great Gothic style of the middle ages.

LOMBARDS, a German people of the Suevic family, not very numerous, but of distinguished valor, who played an important part in the early history of Europe. The name is derived from *Longobardi*, or *Langobardi*, a Latinized form in use since the 12th c., and was formerly supposed to have been given with reference to the long beards of this people; but it is now derived rather from a word *parta*, or *barte*, which signifies a battle-axe. About the 4th c. they seem to have begun to leave their original seats (on the lower Elbe, where the Romans seem to have come first in contact with them about the beginning of the Christian era), and to have fought their way southward and eastward till they came into close contact with the eastern Roman empire on the Danube, adopted an Arian form of Christianity, and after having been for some time tributary to the Heruli, raised themselves upon the ruins of their power, and of that of the Gepidæ, shortly after the middle of the 6th c., to the position of masters of Pannonia, and became one of the most wealthy and powerful nations in that part of the world. Under their king Alboin (q.v.), they invaded and conquered the n. and center of Italy (568–69). The more complete triumph of the Lombards was promoted by the accession of strength which they received from other tribes following them over the Alps—Bulgarians, Sarmatians, Pannonians, Norici, Alemanni, Suevi, Gepidæ, and Saxons—for the numbers of the Lombards themselves were never very great.

The Lombards, after the example of the Romans themselves in the conquests of

former times, were for the most part contented with a third of the land or of its fruits. One of their kings, Authari (584–90), assumed the title of Flavius, which had been borne by some of the later Roman emperors, and asserted the usual claims of a Roman ruler; while the administration of the Lombard kingdom was soon so superior to that which then prevailed in other parts of Italy that to many the change of masters was a positive relief from unjust and severe exactions. While the higher nobility, however, in general retained some portion of their former wealth and greatness, the possessors of small properties became fewer in number, and sunk into the class of mere cultivators, to whom it was comparatively indifferent whether they acknowledged a Roman or a Lombard superior. The rights of the municipal corporations also, although acknowledged, were gradually abridged, partly through the encroachments of the Lombard dukes, and partly through those of the higher clergy, till few relics of their ancient self-government remained. These few, however, were the germs from which, at a subsequent period, the liberties of the independent Italian cities were developed.

The conversion of the Arian Lombards to the orthodox faith was brought about by the policy of Gregory the great and the zeal of Theodolinda, wife of Authari, and subsequently of his successor, Agilulf (590–615).

Theodolinda persuaded Agilulf to restore a portion of their property and dignities to the Catholic clergy, and to have his own son baptized according to the Catholic rites. She also built the magnificent basilica of St. John the baptist at Monza, near Milan, in which in subsequent times was kept the Lombard crown, called the *iron crown* (q.v.). The Lombards were ere long fully united to the Roman Catholic church. The contests of the dukes prevented the firm consolidation of the kingdom, or any very considerable extension of its boundaries. The *edict* of the Lombard king, Rothari (638–54), declaring the laws of the Lombards, promulgated Nov. 22, 643, is memorable, as having become the foundation of constitutional law in the Germanic kingdoms of the middle ages. It was revised and extended by subsequent Lombard kings, but subsisted in force for several centuries after the Lombard kingdom had passed away. The Lombards, however, gradually became more and more assimilated to the former inhabitants of the land of which they had made themselves lords; their rudeness was exchanged for refinement, and the Latin language prevailed over the German, which they had brought with them from the other side of the Alps. But of the original Lombard language little is known, nothing remaining to attest its certainly German character except a few words and names, the very ballads in which the stories of Lombard heroes were recorded having only come down to us in Latin versions.

Liutprand (713–44) raised the Lombard kingdom to its highest prosperity. He quelled with strong hand the turbulence of the nobles, gave the finishing blow to the exarchate of Ravenna, and sought to extend his dominion over all Italy. But the popes now entered upon that Macchiavellian policy which they long incessantly pursued, of laboring to prevent a union of all Italy under one government, in order to secure for themselves the greater power in the midst of contending parties. This, with the disputes which arose concerning the succession to the Lombard throne, led to the downfall of the Lombard kingdom within no long time after it had reached its utmost greatness. The popes allied themselves with the Frankish kings, and Pepin, who had been anointed by Stephen II. to the "patriciate," i. e., the governorship of Rome, invaded Italy (754), and compelled the Lombard king Aistulf (749–54), who cherished the same ambitious designs as Liutprand, to refrain from further conquests, and even to give up some of the cities which had already yielded to his arms, which Pepin (755) bestowed upon the Roman church and commonwealth. New causes of hostility between the Frank and Lombard monarchs arose when Charlemagne sent back to her father his wife, the daughter of the Lombard king Desiderius (754–74), and Desiderius supported the claims of the children of Carloman, Charlemagne's brother. In the autumn of 773, Charlemagne invaded Italy; and in May of the following year, Pavia was conquered, and the Lombard kingdom, after an existence of 206 years, was overthrown. In 776 an insurrection of some of the Lombard dukes brought Charlemagne again into Italy, and the dukedoms were broken down into counties, and the Lombard system, as far as possible, supplanted by that of the Franks. In 803 a treaty between Charlemagne, the western, and Nicephorus, the eastern emperor, confirmed the right of the former to the Lombard territory, with Rome, the Exarchate, Ravenna, Istria, and part of Dalmatia; whilst the eastern empire retained the islands of Venice and the maritime towns of Dalmatia, with Naples, Sicily, and part of Calabria. Compare Türk's *Die Longobarden und ihr Volksrecht* (Rost. 1835); and Flegler's *Das Königreich der Longobarden in Italien* (Leip. 1851).

LOM'BARDY, the name given to that part of upper Italy which formed the "nucleus" of the kingdom of the Lombards (q.v.). It consisted of the whole of Italy n. of the peninsula, with the exceptions of Savoy and Venice, and after the fall of the Lombard kingdom, in 774, was incorporated in the Carlovingian empire. In 843 it was created a separate kingdom, but was not entirely severed from the Frankish monarchy till 888. From this time it was ruled by its own kings till 961, when it was annexed to the German empire. Out of the wrecks of the old independent kingdom now arose a number of independent duchies, as Friuli, Mantua, Susa, Piedmont, etc., and soon afterwards

the republics of Venice, Genoa, Milan, and Pavia. These republics consisted of one sovereign town, surrounded by, in many cases, a large extent of dependent territory. The Lombard cities declared themselves independent towards the commencement of the 12th c., and in 1167 were joined by their less powerful neighbors in the "first Lombard league," for the maintenance of their liberties, against Frederic Barbarossa, whom they severely defeated in 1176. In 1225 they were compelled to form the "second Lombard league" against Frederic II., and with similar success. About this time, petty tyrants arose in most of the cities, and the country was distracted by internal dissensions, which were carefully fostered by France and Germany. These two great powers and Spain strove for the possession of Lombardy. The last succeeded in obtaining it in 1540 and held possession till about 1706, when, after another dispute, the duchies of Milan and Mantua (the country bounded by the Ticino, Po, Mincio, and Switzerland), which alone now retained the name of Lombardy, came into the hands of Austria, and were designated "Austrian Lombardy." In 1796 it became part of the Cisalpine republic, but in 1815 was restored to Austria, and annexed politically to the newly acquired Venetian territory under the name of the Lombardo-Venetian kingdom. This union was dissolved in 1859 by the Italian war; Lombardy was given up to the new kingdom of Italy, Austria, however, retaining, for a time, her Venetian territory. There is now no official division called Lombardy, the country having been parceled out into the provinces of Bergamo, Brescia, Como, Cremona, Milan, Pavia, and Sondrio. Its total area was 8,264 English sq.m., with a population in 1862 of 3,261,000.

The northern districts of Lombardy are alpine in character, but the rest of the country is of extraordinary fertility, induced chiefly by the universal practice of irrigation. The country is celebrated for the products of its pasture-land and as much as 50,000,000 lbs. of cheese is annually produced in the dairies of Lombardy. Agriculture is here in a more advanced state than in any other part of Italy, wheat, rice, and maize being the principal crops; melons, gourds, oranges, figs, citrons, pomegranates, peaches, plums, and other fruits of excellent quality are largely produced. The numerous mulberry plantations form another prominent feature, and vines are extensively cultivated, though the wine produced from them is of inferior quality. Various kinds of marble, some of them of great beauty, form the chief item in the mineral products of Lombardy; a few iron mines exist in Como and Bergamo. The chief manufactures are silk, cotton, and woolen goods, flax, paper, glass, and pottery; the annual value of the silk exceeds £3,000,000. Education is very generally diffused among the people, and they are well supplied with newspapers and scientific and literary journals.

LOMBOK', an island in that crescent group in the Malayan archipelago known as the Sunda islands. It lies between Bali on the w., and Sumbawa on the e.; lat. from 8° 12′ to 9° s., long. from 115° 44′ to 116° 40′ east. Area estimated at 1480 sq.m.; pop. at 200,000, who are all Mohammedans. The n. and s. coasts are each traversed by a chain of mountains, some of which are volcanic, but the interior is a fertile valley. Rice and cotton are largely cultivated, 20,000 tons of the former being exported annually. The capital is Mataran; the principal seaport, Ampanam.

LOMBRIZ, an epizootic disease which attacks young sheep in Texas and New Mexico. Great numbers of reddish hair-like worms infest the stomach and flesh of the animals, destroying them in droves. It generally attacks those which are not well cared for, or at least proves more fatal among them. The usual remedies which are said to be attended with success are equal parts of salt, sulphur, and sulphate of iron (green copperas).

LOMÉNIE, Louis Léonard de, b. France, 1818; descended from eminent ancestors, one of whom was a victim of the massacre of St. Bartholomew's. His first literary work was a series of biographical sketches, published under the title *Galerie des Contemporaines Illustres par un Homme de Rien.* In 1845 he obtained the chair of literature in the college of France. In 1871 he became a member of the French academy in the place vacated by the death of Merimée. His *Biographies des Homme de* 1789*; Beaumarchais et son temps, études sur la Société Française; La Comtesse de Rochefort et ses Amies;* and *Mirabeau*—are among his principal works.

LOMONOZOFF, Mikhail Wasitowitz, 1711–65; b. Russia; son of a poor fisherman, who in the midst of poverty and want exhibited such hunger for knowledge and instinct for poetry as to excite the friendship of a priest, who placed him in a school of Moscow. Thence his talents procured him entrance to the university of Kiev, and to the academy of St. Petersburg. His great learning in due time secured him the position of professor of chemistry and director of the mineralogical cabinets of the university of St. Petersburg. He was sent by that institution to Germany to acquire a practical knowledge of mining and mineralogy, and while there familiarized himself with the German poets. The range and variety of his studies and authorship are remarkable. It embraces annals of the Russian sovereigns, a history of Russia, works on mineralogy and chemistry, a Russian grammar and rhetoric, original poems, and a great number of translations. He is called the father of modern Russian literature, and

his grammar is said "to have drawn out the plan, and his poetry to have built up the fabric of his native language." The life of Peter the great was the subject of his main poem, a heroic epic in two cantos, said to be unsurpassed in the language. He became one of the counselors of state, and died in middle life, crowned with the esteem and admiration of his countrymen.

LOMEN'TUM. See LEGUME.

LO'MOND, LOCH, the largest of the Scottish lakes, lies between Dumbartonshire on the w. and the counties of Stirling and Perth on the east. It is 24 m. long, is 7 m. broad at the southern extremity, though the northern half is only about a m. in width, and has an area of 45 sq. miles. Its depth varies from 60 to 600 ft., and its surface is only about 22 ft. above the level of the sea. The waters of the loch are swelled by the contributions of many streams, the chief of which is the Endrick, from the s.e.; the surplus waters are carried off by the Leven, an affluent of the Clyde. The lower portion of the loch is surrounded by a hilly but well-cultivated and finely wooded country, and the character of the scenery is in the highest degree rich and beautiful. Around the northern portion of the loch are piled high, wild, and picturesque masses of mountains —Ben Lomond on the e., and the Arrochar hills on the west. The surface is dotted over with numerous islands, which are finely diversified in their general appearance, and contribute greatly to the exquisite beauty of the scene. Several steamers ply on the lake.

LOMUS, in Hindu mythology—according to Vollmer—is the first created being formed by Brahma. Deciding to devote himself to the contemplation of divine things, in order to be undisturbed he buried himself in the ground. This pleased the gods so much that they loaded him with favors, increased and confirmed his power and piety, and assured him a duration of life surpassing even that of Brahma. Lomus is said to be 20 m. long, and covered with hairs, of which he draws out one during the lapse of each cycle of Brahma, and will die only after the last is drawn.

LOMZA, a government of Russia, formerly a part of the Polish government of Augustovo; 4,666 sq.m.; pop. 501,385. It is bounded by the government of Grodno on the e. and by e. Prussia on the n.w. Capital, Lomza.

LOM'ZA, a district t. in the government of the same name, in Poland, on the left of the Narev, a tributary of the Vistula, and 85 m. n.e. of Warsaw, played a prominent part in the history of Poland, but has never recovered from its sufferings during the Swedish wars. Lomza has a college, a gymnasium, an arsenal, and several paper-mills, and cloth and linen factories in its neighborhood. Pop. '67, 10,340.

LONA'TO, a t. in n. Italy, province of Brescia; pop. 6,462. It is situated on a height about 3 m. from the southern shore of lake Gonda, surrounded by walls, defended also by a citadel. It is in a fine silk district. The principal church is surmounted by a splendid dome. The town is of Roman origin, was devastated by war and pestilence in the middle ages, and in modern times was the scene of two great battles between the French and Austrians in 1706 and 1796, the French being in both victorious.

LONDON, the capital of the British empire, stands on both banks of the Thames, about 60 m. from the sea. The dome of St. Paul's is in lat. 51° 30′ 48″ n., and in long. 5′ 48″ west. The river here varies from 900 to 1200 ft. in width.

London, under the names *Londinium, Londinum,* and *Augusta,* was one of the chief stations of the Romans in Britain. They encircled a portion of what is now the *city* with a wall, which was rebuilt and extended in later ages. In Stow's time, the remains of the Norman or Anglo-Norman wall were about 2 m. in extent, from the Thames at the Tower to the Thames at Blackfriars. The great fire of 1666 and continual reconstructions in later ages have nearly obliterated all traces of the old wall. The seven gates which pierced it are entirely gone, *Temple Bar* being merely one of the outer bars or suburban gates.

It is almost impossible to say what is the *size* of London, because there is no boundary wall, nor any definite number of surrounding villages and parishes included within it. "London within the walls," the original city, comprises only 370 acres; "London without the walls" comprises 230 acres; then there are the city of Westminster and the borough of Southwark; the "Tower Hamlets," comprising Bethnal Green, Whitechapel, Stepney, Mile End, Poplar, Blackwall, etc.; the northern suburbs of Marylebone, Portland Town, Camden and Kentish Towns, St. Pancras, Hampstead, Islington, Dalston, Clapton, Hackney, etc.; the western suburbs of Kensington, Chelsea, Pimlico, Tyburnia, Notting Hill, Bayswater, Westbourne, Fulham, Paddington, etc.; many parishes in the center, but westward of the city; Bermondsey, Lambeth, Newington, Wandsworth, Kennington, Stockwell, Brixton, Clapham, Camberwell, Peckham, Rotherhithe, etc., in Surrey; and Deptford, Greenwich, Penge, Hatcham, Blackheath, Lewisham, Lee, etc., in Kent. The *post-office* London is larger than the *parliamentary* London; and the *police* London is larger than either. It is usual, however, now to take, as the limit of

London, the area under the operation of the "metropolis local government act," which is also adopted by the registrar-general for the census, and for the tables of mortality; it is nearly identical with the area under the control of the metropolitan board of works, and with that under the control of the London school board (established by the education act of 1870). The area of the metropolis, as thus defined, is about 78,200 acres, equal to 122 sq. miles. This area contained, in 1861, 359,421 inhabited houses and 2,803,034 inhabitants; and in 1871, 417,348 houses and 3,251,804 inhabitants. On census night, April, 1871, the exact population of the metropolis, under six different interpretations of that term, was as follows:

City of London	74,732
Parliamentary London	3,008,101
Registrar-general's London	3,251,804
Local-management London	3,264,530
School-board London	3,265,005
Police London	3,883,092

In round numbers, the dimensions may be estimated at about 13 m. from e. to w., and 9½ from n. to south. For *parliamentary* purposes, London constitutes ten boroughs—viz., city of London, Westminster, Southwark, Marylebone, Finsbury, Tower Hamlets, Hackney, Chelsea, Lambeth, and Greenwich; the first sending four members, and the others two each. For *poor-law* purposes, London is divided into 40 unions, in some cases single parishes, in others groups of parishes. The "metropolitan buildings act" of 1855—which gives some kind of official control over the ranging of houses in streets, the removal of projections and sheds, the management of rebuilding and repairs, the compulsory repair of houses in a dangerous condition, etc., divides the metropolis into 56 districts, of which 4 are in the city of London, 5 in the city of Westminster, 30 in other parts of the metropolis n. of the Thames, and 17 s. of the Thames. The city of London, as it cannot increase in size, is rapidly *decreasing* in population, owing to the substitution of large commercial establishments for dwelling-houses. Little over 70,000 persons *sleep* in the city at night, whereas nearly 700,000 enter and quit it every day.

The Thames at London is crossed by the following *bridges:* London bridge, South-eastern railway city bridge, Southwark bridge, Chatham and Dover railway bridge, Blackfriars bridge, Waterloo bridge, Charing Cross railway and foot bridge, Westminster bridge, Lambeth bridge, Vauxhall bridge, Pimlico railway bridge, Chelsea suspension bridge, Cadogan or Albert bridge, Battersea bridge, West London railway bridge, Putney bridge, and Hammersmith bridge. (The bridges at Barnes, Kew, and Richmond can scarcely be said to be within metropolitan limits.) Near and between these bridges are about 20 *steamboat piers* for the accommodation of river passengers. The *Thames tunnel*, formerly a footway under the river, 1200 ft. long, about 2 m. below London bridge, now constitutes part of the *East London railway*. A little way below London bridge is the *tower subway*, a small tunnel for foot passengers. For the accommodation of such shipping as cannot conveniently load and unload in the river, *St. Katharine's docks, London docks, Limehouse docks, West India docks, East India docks*, and *Victoria docks* have been formed on the northern shore; and the *Commercial* and *Grand Surrey docks* on the southern. The part of the Thames just below London bridge, called the *pool*, is the great rendezvous for coal-ships; below that, as far as Blackwall, is the *port*, occupied by ships of greater burden. Of *canals*, the Paddington, Regent's, and Grand Surrey are the chief.

In matters of government London is under very varied jurisdiction. The lord mayor and corporation exercise peculiar powers in the *city* in reference to tolls, dues, markets, the administration of justice, police, drainage, lighting, paving, and a variety of other matters. The city is divided into 25 *wards*, each represented by an alderman; the aldermen are chosen for life, and are magistrates by virtue of their office. The *common council* consists of 206 members, who, with the lord mayor and aldermen, form a kind of parliament for the management of city affairs. The *Mansion house* and *Guildhall* are the chief buildings for the transaction of corporate business. The *metropolitan commissioners of police* and the *metropolitan board of works* have control over the whole metropolis *except* the city. Westminster and Southwark are each under local authorities, but only in minor matters. The *drainage* is managed by two boards of works, one for the city and one for the rest of the metropolis, and has been improved by a vast and costly system of sewerage, paid for by the householders. Nearly all the drainage and sewage enter the Thames at points 12 m. below London bridge instead of in London itself; the expense of these great works has reached nearly £5,000,000. The *gas* supply is in the hands of joint-stock companies; and so is the *water* supply: the water being obtained from the Thames, and from the New river, one of its affluents. Both systems are in some degree controlled by the boards, etc., above named. In *police* jurisdiction the city of London is entirely distinct from the rest of the metropolis. In 1863 an attempt was made by the government to bring all under one jurisdiction; but the opposition of the citizens was so strong that the attempt failed. The city police, about 700 in number, are in 6 divisions, and have 7 stations; there are two police-offices or justice-

rooms, one at the Mansion house and one at Guildhall. All the rest of the metropolis is under the commissioners of metropolitan police, with head-quarters at Whitehall. There are 21 divisions, all but one (the Thames police) denoted by letters of the alphabet; the full force, officers and men, is about 8,500. There are 14 police courts, attended by 23 police magistrates, for taking cognizance of offenses within the metropolis, but outside the *city*.

The *streets* of London, extending, with lanes and courts, nearly 30,000 m. in aggregate length, depend mainly for their direction on the course of the Thames; the principal of them being nearly e. and west. One line of route extends from Hammersmith to Mile End and Bow, through Piccadilly, Strand, and Cheapside; another, beginning in the Uxbridge road, passes through Oxford street and Holborn, and joins the former at Cheapside. There is still a deficiency of wide thoroughfares for the city traffic; but a new street has lately been made from Blackfriars bridge to the Mansion house—in connection with the northern or *Victoria Thames embankment*—the two together forming a wide and handsome avenue from Westminster abbey to the heart of the city. London is very deficient in wide convenient streets running n. and south. Most of the new streets formed within the last few years are far superior in all respects to those formed fifty or a hundred years ago—except those at the outskirts, which are mostly poor and slight. Regent street and the Quadrant form the finest street in London for general effect; but the most palatial street is Pall Mall, owing to the number of *club-houses* situated there, most of which are fine buildings. Of the 50 or 60 principal club-houses in London, the *Army and Navy*, *Guards'*, *University*, *Carlton*, *Reform*, *Travelers'*, *Athenæum*, *United Service*, and *United University* are in this one street. A continuous range of fine shops extends from Pall Mall to Cornhill.

Among the buildings in London belonging to the crown or to the nation, the following are the principal: *St. James's palace*, an irregular and inelegant cluster of buildings, used for court purposes, but not as the queen's residence. *Buckingham palace*, the queen's London residence, a large but low quadrangular mass, with very inadequate court accommodation. *Marlborough house*, residence of the prince and princess of Wales. *Kensington palace*, occupied partly by royalty, partly by recipients of court favor. *Houses of parliament*, a vast structure, which has cost £3,000,000; perhaps the finest, and certainly the largest, Gothic building in the world applied to civil purposes; the river-front is 900 ft. long. *Westminster hall*, a noble old structure, of which the main hall is 290 ft. by 68, and 110 high. *Somerset house*, a quadrangular structure with a river-frontage of 600 ft.; it is mostly occupied by government offices. The *admiralty*, noticeable chiefly for the screen in front of the court-yard. The *horse guards*, the official residence of the commander-in-chief, with an arched entrance to St. James's park. The *treasury*, the *home office*, the *privy council office*, and the *board of trade* occupy a cluster of buildings in Whitehall. The *foreign and India offices* form a noble new group near Whitehall; and the *colonial* and other offices are being built immediately adjacent. The *war office*, in Pall Mall, a large but plain brick building. The *British museum* (q.v.). The *national gallery*, devoted to a portion of the national pictures, in Trafalgar square. The *museum of economic geology*, in Jermyn street, a small but well-planned building. *Burlington house*, appropriated by the nation to the royal academy and to several scientific societies. The *South Kensington museum*, a medley of buildings more remarkable for convenience than for beauty, and filled with a miscellaneous but valuable collection. The *guards' barracks*, Chelsea. The *custom house*, with a long room 190 ft. by 66, is finely situated on the river side. The *general post-office*, a noble mass in St. Martin's-le-Grand, has a central hall 80 ft. by 60, and 53 high, with a vast number of offices all around it; and a large new block of buildings just opposite, finished in 1873. The *mint*, on Tower hill, is a cluster of buildings in which the gold and silver coinage is managed (a new structure near the Thames embankment is in contemplation). The *Tower of London* is a confused mass of houses, towers, forts, batteries, ramparts, barracks, armories, store-houses, and other buildings, included within a boundary of about 900 ft. by 800, at the extreme eastern verge of the city.

London is the seat of a bishopric, which comprises about 320 benefices. The income of the bishop is £10,000 a year. St. Paul's is the cathedral for the diocese; it is situated at the e. end of Ludgate hill, extending to Cheapside, and was built by sir Christopher Wren (1675–1710) at a cost of £748,000. It is built in the form of a cross, is 514 ft. long, by 286 wide; the cross, which surmounts the ball over the dome, is 356 ft. above the marble pavement below. St. Paul's contains many monuments to illustrious persons. (Plans are in progress for an extensive and costly restoration of the interior.) *Westminster abbey*, also cruciform, is 530 ft. in extreme outer length, by 203 in width; the west towers are 225 ft. high. Henry VII.'s chapel, at the e. end, is a beautiful example of enriched Gothic. The abbey has no special connection with the see of London, but is intimately connected with some of the court and parliamentary ceremonials. It was originally a Benedictine monastery, and is said to have been founded by Sebert, king of the East Saxons (*circa* 616); enlarged by king Edgar and Edward the confessor; and rebuilt, nearly as we now see it, by Henry III. and Edward I. Here the kings and queens of England have been crowned from Edward the confessor to queen Victoria; and here many of them have been buried. The *poet's corner*, with its tombs and mon-

uments of eminent men, is a well-known spot of the abbey. *St. Savior's*, in Southwark, is the third in importance of the London churches. The largest Roman Catholic church is in St. George's fields. The largest dissenting chapel is Mr. Spurgeon's *Baptist tabernacle*, Newington Butts. There are in London nearly 1000 places of worship, of which those belonging to the church of England are rather less than one-half; the religious denominations are about 30.

Of *schools* of all kinds, there are in London about 2,000, including private, parochial, ragged, church and chapel, national, British, free, grammar, and rate-payers' board schools. Many small and inefficient private schools have lately been closed as a consequence of the opening of good public schools. The chief educational establishments are: *London university, King's college, University college, Gordon college, Regent's Park college, New college, Wesleyan college, Hackney college, training colleges* belonging to the national, British and foreign, and home and colonial school societies, *Westminster school, St. Paul's school, Charter-house school, Christ's Hospital* or the *Blue-coat school*, the *Gray-* and *Green-coat schools, Merchant-tailors' school, Mercers' grammar school, City of London school*, and two *ladies' colleges*. The new schools, which have been built by the London school board, are large and handsome.

There are about 70 alms-houses in London. The societies, associations, and institutions of a more or less permanent character, maintained for other than money-making objects, are not less than 600 in number. Of the *hospitals*, the chief are *Guy's, St. Thomas's*, the *London*, the *Poplar*, the *Westminster*, the *Charing Cross, St. George's, St. Mary's, Middlesex, King's College, University College, Great Northern*, the *Small-pox*, the *Fever*, the *Consumption*, the *Lock*, and the *Royal free hospitals. St. Thomas's hospital*, a magnificent pile, has lately been rebuilt on the *Albert* or *southern Thames embankment*, opposite the houses of parliament. *St. Luke's*, and *Bethlehem* (for insane persons), and the *foundling hospital* are special in their objects. Of the 600 institutions above alluded to, about 200 are hospitals, dispensaries, infirmaries, and asylums; while the remaining 400 are religious, visiting, or benevolent institutions.

There are law-courts, civil and criminal, of all degrees of dignity, and with various extent of jurisdiction, scattered over London. For some of the more important of them, more worthy buildings are being erected near the Strand. There are 7 sessions-houses (Old Bailey, Guildhall, Tower Hamlets, Southwark, Kensington, Clerkenwell, and Westminster). The prisons have undergone many changes within the last few years, partly owing to the decay of old buildings, and partly to changes in the law of imprisonment. At present the buildings actually used as prisons are about twelve in number, the chief being Newgate, Holloway, Pentonville, Cold Bath Fields, Milbank, Clerkenwell, Brixton, Fulham, and Wandsworth. The chief buildings in London connected with law and justice are the following: the *Westminster hall* courts of law and equity; the *Lincoln's inn* courts of equity; the *Guildhall courts;* the *central criminal court* in the Old Bailey; *ecclesiastical* and other special courts at Doctors' Commons, etc. (New buildings designed to take the place of most of these are being erected on ground cleared for the purpose between the Strand and Lincoln's inn.) What are called the *inns of court* are in some sense colleges for practitioners in the law; they comprise the *inner temple*, the *middle temple, Lincoln's inn*, and *Gray's inn;* and there are others called *inns of chancery*, comprising *Thavies's, Furnival's, Staple, Barnard's, Clifford's, Clement's, Lyon's, New*, and *Serjeant's inns*. Connected incidentally with legal matters is the *record office*, a large depository for official papers in Fetter lane. The legal practitioners in London, besides judges, etc., comprise about 4,000 solicitors and attorneys, and 2,000 barristers.

In connection with the shipping of London, and the import and export trade, the *docks* above named contain more than 300 acres of water space, and a large amount of warehouse, shed, and vault accommodation—besides warehouses in various parts of the city, away from the docks. From 6,000 to 7,000 ships enter these docks annually. Nearly all the sailing-vessels which come to London laden with coal, instead of entering docks to unload their cargoes, lie in the stream of the river, and transfer their coal to lighters, which convey it to the yards of coal-merchants, situated either on the banks of the river itself, or of the canals which run into it. One-fourth of the whole ship tonnage of England, and one-half of the *large* steamers belong to London. Of the ships that enter the port of London, about 60 per cent are engaged in the *foreign* and *colonial* trade, 40 per cent in the *coasting* trade. About 100 vessels enter the port *every day*, four-fifths British, the rest foreign. The value of all the merchandise exported from the port of London is nearly one-fourth of that of the exports for the whole United Kingdom. The imports of wheat, flour, cotton, dye-stuffs, palm-oil, and some other articles, are greater into Liverpool than into London; but London takes the lead in the imports of colonial produce, wines, and spirits. London receives about half of the total customs revenue of the kingdom, owing to the fact that duty-paying commodities constitute so large a proportion of its aggregate imports.

The principal markets of London are the *cattle market* at Pentonville, *Covent Garden* (vegetable) *market*, *Billingsgate* (fish) *market*, and *Smithfield* (meat and poultry) *market*. The *Columbia market*, Bethnal Green, presented to the corporation of the city by baroness Burdett-Coutts, has not met the anticipated want. In Bermondsey is a commercial

hide and skin market. The establishments for wholesale dealings are, of course, stupendous in character. Of coal alone, London now requires more than 6,000,000 tons annually. The whole number of distinct trades or occupations in London is about 2,000. There are about 80 *trade guilds* or *city companies* in London, many of which possess large revenues; but they do not now exert much influence on the actual course of trade and manufactures; the chief among them, called the *twelve great companies,* are the *mercers', grocers', drapers', fishmongers', goldsmiths', skinners', merchant-tailors', haberdashers', salters', ironmongers', vintners',* and *clothworkers'* companies, all of which have *halls,* in which banquets are held. The *goldsmiths', apothecaries',* and *stationers'* companies still exercise some active control over those trades. The *banks* in London, either private or joint-stock, are about 100 in number, many of which have two or more banking-houses. There are about as many *insurance offices,* some for life only, some for fire only, some for life and fire. The buildings for these banks and insurance offices are among the best in London. The *bank of England,* one of sir John Soane's most successful works, gives employment to about 1000 clerks, etc. The *royal exchange* is noticeable chiefly for sir R. Westmacott's sculpture in the pediment. The *corn exchange,* the *coal exchange,* and the *hop and malt exhange* are convenient for their purposes. The *stock exchange,* near the bank, is nearly hidden from view. The great warehouses for foreign and colonial produce lie chiefly eastward of the city; while the wholesale establishments for textile goods occupy enormous buildings in the neighborhood of Cheapside and St. Paul's churchyard. Most of the large manufacturing establishments lie either eastward or southward, the center and the w. of the metropolis being engaged in selling rather than in making. Large clusters of excellently arranged dwellings and lodging-houses for the working classes have been erected in various parts of London.

The *passenger* and *goods* traffic in London requires vast resources. There are 11 railway companies, having the termini of their lines in London, besides minor lines, more or less under the control of those companies. In addition to about 20 large passenger stations, there are at least 150 smaller within the limits of the metropolis. There is one railway n. and s. through the heart of London, and four extending nearly through it e. and west. The vastness of the local traffic may be illustrated by the fact that the *metropolitan* and *metropolitan district railways,* working in concert, dispatch about 500 trains per day, and accommodate about 30 stations, all within the limits of the metroplis, and all north of the Thames. There are in London about 140 *booking-offices* connected with inns, having relation to passenger and carrier traffic. For water-traffic there are about 50 *wharfs* and *quays* on the Thames, besides a considerable number on the regent's and other canals. There are about 1700 omnibuses and 6,000 cabs. It has been ascertained that on an average day 1000 vehicles per *hour* pass through Cheapside; and, on an average day of 24 hours, 170,000 persons and 20,000 vehicles have been counted crossing London bridge. A great length of street tramway has been formed in London and the suburbs.

Of the open places in the metropolis, the *parks* are the most important. *Hyde park, St. James's park,* the *Green park, Regent's park, Victoria park, Kensington park, Finsbury park, Southwark park, Kennington park,* and *Battersea park,* all belong to the nation, and are purposely kept out of the builders' hands; they are most valuable as "lungs" to London. *Primrose hill* and *Hampstead heath* may be included in the number. The *Zoological gardens, Horticultural gardens,* and *Botanic gardens* are beautiful places, belonging to private societies. The *cemeteries,* substitutes for the old churchyards, are at Highgate, Finchley, Stoke Newington, Mile End, Kensal Green, Bethnal Green, Brompton, Nunhead, Colney Hatch, Camberwell, Norwood, etc. Of places of amusement, there are 3 opera-houses, about 30 theaters, 12 music-halls and concert-rooms of large dimensions (including *Albert hall*), a much larger number of smaller size, and very numerous exhibition-rooms of various kinds, of which the *annual international exhibitions* building at South Kensington was opened in 1871. Of public *columns* and *statues* in open places, London contains a smaller number than is due to its size. The chief are the following: The *Albert memorial,* Hyde park; the *Monument,* Fish street hill; *Nelson column,* Trafalgar square; *Wellington statue,* Hyde park corner; *Achilles statue,* Hyde park; *Guards' memorial,* Pall Mall; *Crimean monument,* Westminster; *York column,* Waterloo steps; *Havelock's* and *Napier's* statues, Trafalgar square; *Outram's statue* and *Cleopatra's needle* on the Thames embankment, etc. Of *drinking fountains,* which are numerous, the finest was presented to Victoria park by baroness Burdett-Coutts. There are very cheap *public baths and wash-houses* in London.

London is now supplied with hotels in a manner adequate to its size and importance. The best of those belonging to the railway companies are the *Great Northern,* the *Midland,* the *Victoria and Euston,* the *Great Western,* the *Grosvenor,* the *Charing Cross,* and the *Cannon Street.* Of the others, the only one grand in appearance is the *Langham.*

LONDON (*ante*). Following is the table of population for the metropolis from the tables of the registrar-general for 1871:

Part of Middlesex.						Part of Surrey and Kent.	
West Districts.		*Central Districts.*		*East Districts.*		*South Districts.*	
Kensington	283,153	St. Giles	53,556	Shoreditch	127,164	St. Saviour } Southwark	175,049
Chelsea	71,089	Strand	41,339	Bethnal Green	120,104	St. Olave } Southwark	122,398
St. George, Hanover square	155,936	Holborn	163,491	Whitechapel	76,573	Lambeth	208,342
Westminster	51,181	London city	75,983	St. George in the East	48,052	Wandsworth	125,060
North Districts.				Stepney	57,690	Camberwell	111,306
Marylebone	159,254			Mile End, Old Town	93,152	Greenwich	100,600
Hampstead	32,281			Poplar	116,376	Lewisham	51,557
St. Pancras	221,465					Woolwich	73,380
Islington	213,778						
Hackney	124,951						

In Middlesex	2,286,568
" Surrey	742,155
" Kent	225,537
Total population	3,254,260

LONDON, chief city of the co. of Middlesex, Ontario, Canada, is situated at the junction of the two branches of the river Thames, about 114 m. w.s.w. from Toronto, with which it is connected by the Great Western railway. The situation, whose fitness for a town was recognized by gen. Simcoe as early as 1784, only began to be cleared and laid out in 1825; but such has been the rapidity of the city's growth that, in 1852, the population had risen to 7,124; in 1857, to 16,000; and although it had fallen at the census of 1861 to 11,555, it has again (1871) risen to 15,826. With the suburbs, it is about 20,000. When the city was called London, the river, which had formerly been known by an Indian name, received that which it now bears; a Westminster and a Blackfriars bridge were thrown over it; and the names given to the principal streets and localities, still seem to indicate a desire to make the westernmost city of Canada a reproduction, as far as possible, of the capital of England. The Thames will probably be made navigable as far as London, to give it a communication by water with the lakes, and it has already an outlet by railway to every part of the American continent. The center of a rich agricultural district, London carries on a large trade in the produce of the country, while there are also many foundries, tanneries, breweries; printing-offices, issuing three daily and several weekly newspapers; and, outside the city, large petroleum refineries. Huron college, Hellmuth college, and Hellmuth ladies' college are educational institutions recently established.

LONDON, Custom of, in English law, is peculiar in several respects, and the laws there differ in those respects from the rest of the country. Thus, in the city (and by the city is meant only the city proper, or a small portion of the metropolis), a law of foreign attachment exists, which resembles the Scotch law of arrestment, by which a creditor may attach or seize the goods or debts of his debtor, in the hands of third parties, to abide the result of an action to be brought. The city of London also had a custom until recently which resembled the Scotch law of *Legitim* (q.v.) and *Jus Relictæ* (q.v.), by which a person at death could not by will disinherit his children, or leave his wife destitute. This custom was abolished by the stat. 19 and 20 Vict. c. 94. There is also a peculiar custom by which the common council elect their own sheriffs, instead of the crown electing them. There are also several other customs relating to local offenses of minor importance.

LONDON CLAY, or Lower Eocene Strata (q.v.), are a series of beds occupying the lower basin of the Thames from Hungerford to Harwich and Herne bay; and also an extensive triangular region in Hampshire and the neighboring counties, whose base extends along the coast from Dorchester nearly to Brighton, while its apex reaches to Salisbury. The beds are arranged in three sections: London clay proper and Bognor beds, maximum thickness 480 ft.; plastic and mottled clays and sands, maximum thickness, 160 ft.; Thanet sands maximum thickness 90 ft.: total, 730 feet.

The London clay proper consists of tenacious dark-gray and brown clay, with layers of septaria, which occur in sufficient quantity in the beds near Harwich and along the coast of Harwich to be used for the manufacture of Roman cement. In Hampshire the clays are bluish, and have running through them bands of sand, sometimes compacted into hard stone, called Bognor rock. In both basins the clay rests on a thin bed of variously colored sand and flint pebbles. The London clay is rich in fossils. Many palm and other fruits have been described by Bowerbank from the island of Sheppey: masses of wood, often bored by the teredo, are not unfrequent. The mollusca belong to genera which now inhabit warmer seas than those of Britain, such as cones, volutes, nautilus, etc. About fifty species of fish have been described by Agassiz from Sheppey, among which are a sword-fish and a saw-fish. The remains of several birds and pachydermatous animals tell of the neighborhood of land; and the numerous turtles,

with the crocodiles and gavials, whose remains are associated with them, no doubt infested the banks of the great river which floated down the Sheppey fruits.

The plastic clays, or Woolwich and Reading series of Prestwich, are very variable in character, consisting chiefly of clays and argillaceous sands, which are used, as their name implies, in the manufacture of pottery. They contain a mixture of marine and fresh-water shells, showing that they have been deposited in estuaries. They attain their maximum thickness of 90 ft. in the isle of Thanet, and thin out westward, till at Windsor they are only 4 ft. thick—beyond this they entirely disappear.

LONDON CONFERENCES. The first diplomatic meeting so designated was held in 1826 and the following years, for the regulation of the affairs of Greece; the next one was held in 1830, to arrange terms of agreement or of separation between Belgium and Holland. The terms of agreement proposed not being accepted by the disputants, Holland made an appeal to arms; but the capture of Antwerp by the French, and the blockade of their coast by the English and French fleets brought the Dutch to agree to a treaty of definitive separation, May 21, 1833. A third conference was held in 1840, on the Turko-Egyptian question, in which France refused to take part. In 1851 a protocol was signed in London by the representatives of all the great powers, declaring the indivisibility of the Danish monarchy (inclusive of Sleswick and Holstein).

LONDONDERRY, a maritime co. of the province of Ulster, in Ireland, 40 m. in length by 34 in breadth, bounded n. by the Atlantic, e. by the county Antrim, and in part by lough Neagh, s. by Tyrone, and w. by Donegal. Its area is 816 sq.m., or 522,315 acres, of which 91,759 are mountain, bog, waste, water, towns, etc. The pop. in 1871 was 173,906, of whom 77,358 were Catholics, 58,779 Presbyterians, 32,079 Episcopalians, and nearly 1000 Methodists. The surface of Londonderry is irregular. From the eastern boundary it rises gradually toward the w. for a distance of about 10 m., where commences an elevated district, rising in several points to a considerable height; Sawell, on the southern border, being 2,236 ft. high. On the western side the surface falls gradually towards lough Foyle. The coast-line along the Atlantic is generally bold and precipitous. The shore of lough Foyle is in most places an unvarying plain. The county may be divided longitudinally into two great geological districts, separated from each other by the river Roe. In the western, which is mountainous, the mica-slate prevails, accompanied in some places by primitive limestone. In the eastern the mica-slate is overlaid by a succession of varying beds, capped, as in the adjacent Antrim district beyond the Bann, by a vast area of basalt, the dip of which, however, is the reverse of that on the opposite side of the river, and increasing in thickness towards the north, where in one place it reaches a depth of 900 feet. Many of the strata contain iron, and the ironstone of the mountain called Slieve Gallion was formerly worked, but the mining operations have been abandoned, from the failure of fuel. The soil is of a very mixed character, the greater part, with the exception of the alluvial spots on the banks of the several rivers, and of a considerable open district which stretches southward to Tyrone, being ill suited for wheat, or indeed for any cereal crop. In the year 1876, 188,926 acres were under crops of all kinds. The number of cattle was 114,376; of sheep, 34,322; of pigs, 38,161. The total value of cattle, sheep, and pigs was £1,594,359. The system of agriculture has been materially improved under the impulse given by the London society upon the large estates which it holds in the county. The principal rivers are the Foyle, the Faughan, the Roe, and the Bann. The first is navigable as far as Londonderry for ships of 800 tons burden. The Bann, besides being a great source of motive-power for the staple manufacture of Ulster, that of linen, is also celebrated for its salmon-fisheries, which are of great value. The chief towns are Londonderry city (q.v.), Coleraine, Newtown-Limavady, and Magherafelt. Londonderry was in ancient times the seat of the great septs of O'Loughlin and O'Neill, and of their tributary sept of O'Cahan, or O'Kane. At the immediate period of the invasion the English under John de Courcy attempted a settlement, but were forced by the O'Neills to withdraw. A small garrison within their colony was established near the Antrim border, at Coleraine, upon the river Bann; but from the 14th till the 16th c. their tenure was little more than nominal; and although a number of forts, with a considerable garrison, were erected upon the river Foyle in 1600, it was not till the flight of the celebrated Tyrone and O'Donnell that the English occupation of the district was consummated, their forfeited lands being granted by the crown to the corporation of London, who still retain them, the management being vested in a body, 26 in number, who are elected by the common council, one half retiring each year. The incorporation, by charter, of this body in 1619 led to the formation of the county, called, from this circumstance, Londonderry. Portions of the county were assigned to the several city companies, the unassigned portions being held by the society. The memory of the confiscation long rankled, and perhaps still lingers, in the minds of the dispossessed Irish and their descendants; but in material prosperity the district underwent a rapid and marked improvement. The agriculture is in a condition considerably in advance of the majority of Irish counties, and the domestic manufacture of linen, in former times, added materially to the comfort of the population. Of late years, however, this manufacture, in all its branches, has been transferred for the most part to large establishments. There is considerable export and import trade at the ports of Derry and Portrush, which is the seaport of Coleraine.

The former has become a port of call for the Canadian steamers, which touch on their outward and homeward passage at the entrance of lough Foyle. The number of national schools in Londonderry in the year 1861 was 388, attended by 20,696 pupils. In 1875 there were 31,488 pupils. Londonderry returns two members to the imperial parliament.

LONDONDERRY, CITY OF, a seaport, and a corporate and parliamentary borough, capital of the above county, situated on the river Foyle, and distant from Dublin 144 m. n.n.w. Pop. in 1871, 24,242. It returns one member to parliament. Londonderry arose under the shadow of a monastery founded here in the 6th c. by St. Columba. It was pillaged more than once by the Danes, and was occupied, but with many vicissitudes, by the English at the invasion. The town formed part of the escheated territory granted to the London companies, and under their management the city arose to some importance, and was strongly fortified. In the Irish war of the revolution Londonderry threw itself earnestly into the cause of William of Orange, and closed its gates against James II. The siege of Londonderry is one of the most celebrated events in modern Irish history, and its memories are among the most stirring of the occasions of party animosity. Since that date the city has steadily grown in extent and prosperity. It is beautifully situated on the left bank of the Foyle, upon a hill which overlooks the river. The walls are still preserved, and form an agreeable promenade; they surround a part of the town one mile in circumference, but the buildings have extended beyond them. A square from which the four main streets diverge is called the Diamond. The left bank of the river is connected by an iron bridge, 1200 ft. in length, with an extensive suburb called Waterside. The cathedral dates from 1633. A handsome Roman Catholic cathedral has been erected. The court-house also is a building of some pretensions, and the historical events above alluded to are commemorated by a triumphal arch erected in 1789, and a column in honor of the rev. George Walker, who was governor of the city during the memorable defense, of which he was himself the great organizer and inspirer. There are several important educational foundations, one of which, Gwyn's school, has an income of £1870; Magee college, founded in 1865, is an important institution. The arrangements and appliances of the port are on a good scale. Vessels of 500 tons can discharge at the quays, and there is a patent slip capable of receiving vessels of 800 tons. Steamers ply to Liverpool, Glasgow, and Belfast: there is railway communication with Dublin and Belfast, as well as a considerable advance towards direct communication with the western coast, and the lough Swilly line is carried north to Buncrana. In 1875, 1429 vessels of 273,392 tons entered, and 905 of 204,249 tons cleared the port. The chief manufactures are flax-spinning, distilling, brewing, rope-making, and tanning. There is also an extensive salmon-fishery.

LONDONDERRY, CHARLES WILLIAM STEWART VANE, Marquis of, 1778–1854, b. England. Distinguished both as a soldier and diplomatist in the English service from the beginning of the French revolution until the fall of Napoleon in 1815, and a member of the congress of Vienna the latter year. His surname of Vane was added on his marriage with a great heiress of that name. He is the author of a *History of the Peninsula War* in Spain; editor of the correspondence of his brother, lord Castlereagh; and constructor of the harbor of Seaham, England, out of his wife's estate.

LONDONDERRY, ROBERT STEWART, second marquis of, b. at Mount Stewart, Down co., Ireland, June 18, 1769, eldest son of Robert, first marquis, who represented the county of Down many years in the Irish parliament. Educated at the grammar-school, Armagh, and at St. John's college, Cambridge, he entered the Irish parliament in 1789, although then under age. In 1796 he became viscount Castlereagh; and in 1798 he was made chief secretary for Ireland. It was the year of the insurrection and the French invasion, and some allowance must be made for the terrible severities employed by the Irish government. Yet the cruel part he acted or tolerated in Ireland, in the suppression of the rebellion, and effecting the union, always weighed upon his reputation. In 1802 he was appointed president of the board of control, in the Addington administration. In 1805 he was promoted to the seals of the war and colonial department, but resigned, with the whole of the cabinet, on Pitt's death in 1806. In the following year, he resumed the office of war minister, when he organized the disastrous Walcheren expedition. Mr. Canning, then foreign secretary, attacked lord Castlereagh on this account with much acrimony and personality. The result was that both resigned, and a hostile meeting took place between them (Sept. 21, 1809), in which Canning was wounded. In 1812, after the assassination of Mr. Perceval, lord Castlereagh became foreign secretary, a post which he held during the period illustrated by the military achievements of the duke of Wellington. By this time the general direction of British policy was unalterably fixed by circumstances, and lord Castlereagh has at least the merit of having pursued this fixed course with a steadiness, and even obstinacy, which nothing could abate. He was the soul of the coalition against Bonaparte, and it was only by his untiring exertions, and through his personal influence, that it was kept together. He represented England at the congress of Vienna in 1814, at the treaty of Paris in 1815, and at the congress of Aix-la-Chapelle in 1818. While his foreign policy was favorable to the principles and policy of the "holy alliance" abroad, he constantly recommended arbitrary and despotic measures at home. As the leader of the Liverpool government in

the lower house, he carried the suspension of the habeas corpus act in 1817, and the "six acts" or "the gagging bills," as they were called, of 1819—measures which will forever stamp his name with infamy. The retirement of Canning from the ministry rather than be a party to the prosecution of queen Caroline (1820), threw the whole weight of business on lord Castlereagh. By the death of his father in 1821 he became marquis of Londonderry; but his mind became deranged, and he died by his own hand at his seat at Foot's Cray, Kent, Aug. 12, 1822. The populace witnessed the funeral procession in silence; but when the coffin entered the walls of Westminster, a loud and exulting shout rent the air, which penetrated into the abbey, and broke upon the stillness of the funeral ceremony. This statesman, looked upon by one party as a paragon of perfection, has been characterized by the other party as "the most intolerable mischief that ever was cast by an angry providence on a helpless people."

LONDON PRIDE, *Saxifraga umbrosa*, a perennial evergreen from southern Europe. It was brought to Great Britain and cultivated as a garden plant, but soon spread over the fields, especially in Ireland, where it is known as St. Patrick's cabbage. Flower stems, 6 to 12 in. high, bearing a loose panicle of small pink flowers marked with spots of a deeper color. It is used for making borders in gardens.

LONDON UNIVERSITY. When University college, London, was first established (in 1825), it was known as London university, although a mere joint-stock undertaking. A change took place in 1836, when it received a charter as *University college*. At the same time, by another charter, London university was established—not a building for teaching, nor a body of teachers and scholars, but a body of persons empowered to examine candidates and confer degrees. As this second charter was only valid during "royal will and pleasure," it required to be renewed at the death of William IV., and the accession of Victoria; and a new charter was accordingly granted, Dec. 5, 1837. Additional powers were given, July 7, 1850; and a wholly new charter was signed April 9, 1858, instituting many changes in the functions and arrangements of London university; again a wholly new charter, Jan. 6, 1863, with supplement (Aug. 27, 1867), admitting women to certain special examinations. *University college, London*, is still carried on in Gower street, the original spot; but the *university of London*, or London university, after occupying different apartments granted by government, is now established in a special building in Burlington gardens (since 1870). The body consists virtually of a chancellor, vice-chancellor, 36 fellows, and an indefinite number of graduates. The *chancellor* is appointed for life, or during royal pleasure, by the crown. The *vice-chancellor* is annually elected by the fellows from among their own body. The 36 *fellows* were named by the crown in the charter of 1858, for life; but as vacancies occur, the crown and the university fill them up in a mode that gives some control to each. The *graduates* are those who, at any time since 1836, have had degrees (*bachelor*, *master*, or *doctor* of certain faculties) conferred upon them by this university. The *senate* is composed of the chancellor, vice-chancellor, and fellows, and has the power of making the whole of the by-laws for the government of the university—within certain limits prescribed by the charter, and with the approval of the secretary of state. The *convocation* is composed of all the graduates, except those who have taken the lower degrees within less than two years; it meets occasionally, to vote and decide upon several minor matters; but the charter seems to confine all real power to the senate.

When the new charter was given, in 1858, there were 47 colleges and collegiate schools in connection with London university—two in the colonies, and the rest in the United Kingdom. The number was later increased; the secretary of state and the senate having the power of deciding what additional establishments shall be included. But since 1863, it is no longer required that candidates for examination should be certificated scholars of any of these institutions: everything is thrown open, subject to pleasure of senate. *Examiners* are appointed by the senate, which also defines the extent and mode of examination. By the charter of the university, theology is entirely excluded. Yet there is an optional scriptural examination under by-laws. The degrees obtainable are those of *bachelor* and *master of arts*, *bachelor* and *doctor of medicine*, *bachelor* and *doctor of laws*, *bachelor* and *doctor of science*, *bachelor* and *master of surgery*, *bachelor* and *doctor of music*, and *doctor of literature*. There are examinations for women, distinct from men's, in literature and science combined; and these first general examinations may be followed up, at will of candidate, by special examinations for certificates of higher proficiency in particular subjects.

The number of candidates for matriculation in 1876 was 1071, 486 of whom passed: for B.A. (*final*), 141; 59 passed: for M.A., 17; 11 passed: for B.SC. (*final*), 41; 22 passed: for D.SC., 7; 5 passed: for LL.B. (*final*), 22; 13 passed: for M.B. (*final*), 34; 23 passed: for M.D., 17; 11 passed. General matriculation examination must be undergone a certain time previously by candidates for any degree.—London university stands in no special relation to King's college (q.v.) in London.

LONG, ELI, b. Woodford co., Ky., 1837; graduated at the Frankfort, Ky., military school in 1855, and in 1856 was appointed a second lieut. of cavalry in the army of the United States; served for a time with his regiment in conflicts with Indians. In May, 1861, he was promoted to a captaincy, and in 1863 became col. of the 4th Ohio cavalry. He was actively engaged in the most important campaigns at the west.

much of the time commanding a brigade. In 1864 he was appointed brig.gen., and in 1865 he led his division of cavalry in the capture of Selma, Ala., receiving a severe wound in the head. In 1867 he was placed upon the retired list with the full rank of maj.gen.

LONG, GEORGE, M.A., a distinguished classical scholar, was b. at Poulton, in Lancashire, in 1800, educated at Trinity college, Cambridge, where he obtained the Craven scholarship in 1821. Long became chancellor's medalist in 1822, and subsequently fellow of his college. In 1824 he accepted the professorship of ancient languages in the university of Virginia, United States; but returned to England in 1826, to become professor of the Greek language and literature in the London university. This office he resigned in 1831, when he commenced to edit the *Journal of Education*, published by the society for the diffusion of useful knowledge; but probably the greatest labor—the *magnum opus*—of his life was his editing for eleven years (from 1832 to 1843) the *Penny Cyclopædia*, to which he was also one of the most valuable contributors. At the conclusion of the 27th volume, honorable mention is made by the society, and by the publisher, Mr. Charles Knight, of Long, "by whose leaning, unwearied diligence and watchfulness, unity of plan has been maintained during eleven years, and error, as far as possible, avoided." In the midst of these arduous duties, Long joined the inner temple, and was called to the bar in 1837. In 1846 he was chosen by the benchers of the middle temple to deliver a three years' course of lectures on jurisprudence and civil law. In 1849 he became professor of classical literature in the Proprietary college at Brighton, which appointment he held till 1871. Long is one of the best classical editors that England has produced; he is also one of the first authorities on Roman law. His merits as a translator are no less great, as evinced in his *Selections from Plutarch's Lives; Thoughts of Marcus Antonius*, etc. Long has contributed extensively to Smith's Classical Dictionaries; and, besides editing Cicero's *Orations* and Cæsar's *Gallic War*, has published an *Analysis of Herodotus; France and its Revolutions*, etc. In 1873 he was granted a pension of £100.

LONG, LOCH, a well-known loch in the w. of Scotland, extends northward from the firth of Clyde for about 24 m., between the counties of Argyle and Dumbarton. It has an average breadth of about a mile; and its banks, consisting, for the most part, of steep acclivities, abound in striking and picturesque scenery. At its head is Arrochar.

LONG, STEPHEN HARRIMAN, 1784–1864; b. Hopkinton, N. H. After graduating at Dartmouth in 1809, he became a teacher, but in 1814 was appointed 2d lieut. in the U.S.A., corps of engineers; was brevetted maj. in 1816, lieut.col. in 1826, and in 1861 was made chief of topographical engineers, with rank of col. His explorations began in 1816, when he made under great difficulties a survey of the Mississippi and its branches, which at once brought him into public notice. Soon after he led an expedition from the Mississippi to the Rocky mountains, one of the noblest peaks of which bears his name. The results of these arduous undertakings are to be found in works on the subject by Edwin James and W. H. Keating (1823 and 1824). The introduction of railroads furnished col. Long a grand opening for the exercise of his energy and ability. He was concerned in the construction of many of the principal roads of the south and west, and was especially successful in bridge-building. He was the first to suggest the application of the rectangular trussed frame to bridges. He was also extensively employed in the improvement of rivers and harbors. In 1863 col. Long retired from the U.S. army, but still engaged in many enterprises. The long record of remarkably varied and successful labor in every branch of his profession was closed by his death at Alton, Ill

LONGACRE, JAMES BARTON, 1794–1869; b. Delaware co., Penn.; served an apprenticeship with the eminent engraver, Murray, of Philadelphia, and was afterward for many years engaged in illustrating American works. He was associated with James Herring in the preparation of the *National Portrait Gallery of Distinguished Americans*, a work in 4 vols., published 1834–39. In 1844 he was appointed engraver of the U. S. mint, and retained that post until his death. He was the designer of the modern gold coinage of the United States, and superintended the work of remodeling the gold coinage of Chili.

LONGAN, *Nephelium longan*, one of the finest of fruits, of the same genus with the litchi (q.v.), but reckoned superior to it. The tree which produces it is a native of China and of other eastern countries, at least as far w. as the mountainous regions on the eastern frontier of Bengal. It is much cultivated in China. The leaves are pinnate, with few leaflets, the leaflets oblong, the flowers in lax panicles. The fruit is globose, or nearly so. It is imported into Britain in a dried state. It has been produced in Britain by the aid of artificial heat.

LONG-BOAT, a strong and seaworthy boat, formerly the largest carried by a ship, but now generally superseded by the launch (q.v.).

LONG BRANCH, a village in Monmouth co., N. J., includes the village proper, about a mile from the ocean, and the beach with its hotels and arrangements for bathing; pop. 5,000. It is one of the leading watering-places in the United States, and is annually, in the season, the residence of as many as 30,000 visitors from all parts of the

country. Among the principal hotels are the East and West End, United States, Howland's, the Metropolitan, and Leland's. Here also are the summer residences of a number of distinguished persons from New York, Philadelphia, and other cities. Communication is had with New York by steamboat and direct railroad, the latter opened in '75. The village is fully supplied with shops, in some instances branches of large establishments in New York. There are 6 churches, some manufactories, and 1 weekly newspaper, which becomes a daily during the season. The beach is unequaled in extent and convenience in this country; and, during the months of July and August, when crowded with bathers in striking costumes, and throngs of spectators in fashionable attire, presents a scene of singular brilliancy.

LONGCHAMPS, a part of the Bois de Boulogne w. of Paris, for centuries the resort of the pleasure-seekers of that city; still one of the most brilliant promenades in the world, and the site of the principal race-ground of France. It has an interesting history. As early as the 13th c. the abbaye of Longchamps was founded by Isabel, sister of Saint Louis. Monasteries, nunneries, and hospitals gathered round it as they were founded and endowed in successive reigns of the kings of France, until the place at one time became the seat of forty religious organizations. Before the time of Henry IV. they had become the scene of corrupt practices, so that he seems to have had no difficulty in taking Catherine de Verdun, a nun of the age of 22, from the convent to be his mistress. Vincent de Paul, writing to cardinal Mazarin in 1652, says that "this convent for 200 years has been marching towards total depravity of manners to ruin. Its parlors are open to all, even to young gentlemen without parents; the brothers and rectors do not object. The lady *religieuses* wear their garments immodestly and carry gold watches. When war forces them to take refuge in the city they lend themselves to scandal, and go alone and in secret where they are desired." A century before out-door preaching had attracted great crowds from Paris to Longchamps, where, under cover of religious fervor, license found a cloak. In 1521 pope Leo X., by a bull, accorded to the religious organizations of Longchamps the duty of commemorating the miracles of the princess Isabel by services on the last day of August of each year. This became a great fête day, attracting multitudes from Paris. On Mt. Valerian there dwelt many hermits and other religious persons. These also attracted crowds of people at all times who made Longchamps their meeting-place, going to and fro. Centuries before the revolution of 1789 Longchamps was such a resort for the people of Paris that a French writer alludes to it as "a fluxion of these people." In the reign of Louis XV. three days of holy-week were devoted by the rank and wealth of the court to pilgrimages to the abbaye of Longchamps. A French writer of that time remarks of these occasions: "Pleasures and devotions first marched abreast, but pleasures soon stepped to the front." Religious singing became the rage, because it brought together the *beau monde* of Paris, and the beautiful "recluses" of the convent. Crowds went from Paris to hear the delightful singing there, and the training of the church was a school for the opera. Longchamps became the frequent theater of tumultuous crowds. Before the revolution archbishop Beaumont of Paris ordered the church closed on the days when those pleasures of the holy-week had become a scandal to the church; but the gay people from the city found means to continue their reunions elsewhere adjacent to the convent walls.

Such was the character and the popularity of this place of resort when the ordinances of the revolution in 1789–90 confiscated the lands of such religious organizations to the state. The Longchamps properties were sold to speculators. The hammer of innovation destroyed all its monuments of that convent era, of which it had become the most conspicuous shame. There now remain no vestiges of all that history tells us of them. But the same gay throngs that for four hundred years have surged out from Paris to these fields now walk and ride to the race-grounds and park that have taken the place of the buildings and garden of the abbey of Longchamps.

LONGET, FRANCOIS ACHILLE, 1811–71; b. Bordeaux, France; studied medicine and surgery in Paris; became member of the academy of medicine in 1844, and since, professor of the faculty of medicine, member of *l'Institut*, and imperial surgeon of the *legion d'honneur*. As early as 1836 he became eminent for his investigations, and later, pre-eminent for his studies of the spinal marrow and its functions, the action of electricity on the nervous system, the mixed nerves, the classification of brain nerves, the laws governing the excitability of nerves, and their connection with the muscular fibers. He is credited with very interesting explanations of the action of the lungs, the voice, the saliva, and the effects upon the nervous system of the exhalation of sulphuric ether. His published works embrace treatises, reports, and essays on all the above, and many other subjects pertaining to medicine and physiology.

LONGEVITY, prolonged life in plants and animals. This article refers exclusively to human longevity. The subject has attracted attention in all ages, but especially since the more recent and systematic study of biology. It may be viewed with reference to individuals, to families, and to nations. There have been many noted examples of great prolongation of life in individuals, in some of which the history of their progenitors is not given, but enough cases have been observed in which long-lived people have descended from a long-lived stock to show that longevity is a hereditary transmission; therefore, individual and family longevity are intimately connected. Attention to hygienic

laws to a greater degree than that which has been observed by parents, will, as a rule, prolong the life of an individual beyond that of the parents, but it will probably not materially alter the average number of years to which certain families attain. So also of nations, a certain number of generations is a measure of the longest span of life of the individual. The extreme limit seems to be five generations: that is to say, those who attain the greatest age in a nation or race of men may live to see the fifth generation of their descendants. Among the Indo-European races this, as a rule, requires that the life of the individual shall be prolonged to about 120 years. In China, men of less that 100 years of age often live to see their grandchildren to the fifth generation, and all races other than the Caucasian come to maturity sooner than that race, one generation following another more frequently; and it may be taken as a rule that the number of generations and fractions of generations of a people is the measure of the span of life among them. Some remarkable instances of longevity have been observed among African races, and there are many well-authenticated cases where individuals have lived considerably beyond 100 years, but none of them reach the extreme age of the Caucasian. A person who exceeds the age of three-score and ten years may be said to have arrived at a period of longevity. The average duration of life in Europe is from 26 to 33 years, but it is found to be greater among those who are in comfortable circumstances than among the poor. The cause of this is a question about which there is a difference of opinion. It is held by some that the mode of living among the well-to-do increases the physical powers, thus tending to prolong existence. Others, again, although admitting that good living, when not luxurious, tends to prolong life, maintain that the poorer classes are naturally shorter-lived, and are poor because of inherited qualities of mind and disposition which tend to place them in subordinate circumstances. The truth probably is between these two opinions. Many people, doubtless, are poor from natural improvidence and weakness of body and of character, and they are among the short-lived. Others are poor from various circumstances; from want of desire for riches, or from a natural self-reliance, or absence of fear for the future as regards temporal things, and some of these latter often furnish instances of great longevity. There are certain classes of persons who, by fortuitous circumstances, such as happy intermarriage with those living lives calculated to strengthen their constitutions, have produced a tendency to longevity, and who transmit this tendency to their descendants, but they are not exclusively found in any one social condition.

The chief physical characteristics of longevity may be enumerated as follows: 1. Medium weight and medium height, although this is subject to many exceptions. The limbs, especially the lower, rather less than half the length of the whole stature, which is the standard in art, and was instituted by the Greek sculptors. 2. Harmonious proportions (except as to the art standard of stature), rounded and firm joints and limbs, regular features, and a calm expression of countenance, a full chest and a head and neck so placed as to give a graceful and easy bearing. 3. The chin and lower jaw, when full and well formed, are signs of longevity, but not without many exceptions, for prolonged life is often possessed by those who have retreating chins and rather defective lower jaws. The indication, however, holds good, as a rule, and whatever elements of longevity such persons have are probably inherited from ancestors who had well formed lower jaws. 4. The mouth is a feature of considerable importance as an indication of longevity. A firm, rather thin lip, at least one that is not pouting, or has not a wide red border, is a sign of firmness of fiber and vigor, especially of endurance. But there are many exceptions; and when a person has other strong characteristics of longevity this sign should not have too much weight. An incurved or inverted rather than an everted upper lip, and having a firm expression, is not an unfavorable sign, even though rather thick. 5. A rather prominent and well developed nose, in harmony with a capacious respiratory apparatus and a well-developed sensory organization, is a feature entitled to consideration; but it also has many exceptions, probably from inherited peculiarities on one side of the family, which, however, do not materially diminish the tendency to longevity in the majority of such inheritors. 6. The ear, perhaps, furnishes the most important indications of longevity, and in its form, development, and position there may be traced more hereditary characteristics, as well as evidences of individual constitutional strength, than in any other feature. A small, ill-shaped ear is very rarely carried by a long-lived person, if ever; never, if its center is placed much above the level of the wings of the nose. If such an ear is also thin and has a weak look, its possessor certainly has a defective constitution, with strong consumptive tendencies. A full, moderately fleshy ear, called a pulpy ear by artists, is a sign of a vigorous constitution, and also of longevity if placed rather low down and at a good distance from the eye, thus giving room for the various cerebral ganglia which are situated at the base of the brain and have much to do with the harmonizing of physiological functions. If the ear is rather large, and with a well-developed lobe, held firmly to the angle of the jaw, the indications of vigor and long life are increased. Other indications, those of intellectuality, character, etc., are furnished by the formation and size of the ear, but they do not particularly concern the subject of this article. In regard to the complexion, long-lived people vary from light to dark, but the skin is usually smooth and healthy.

Notwithstanding that an inherited strong constitution is the foundation of a long

life, exposure to inclement weather, or an unhealthful climate, or various hardships and privations, with violations of hygienic laws, may produce decay of the physical powers and degeneracy in two or three generations the strong tendency to the recurrence of the original type of constitution will, under favorable circumstances, cause a regeneration of stock. It is also probable that continued breeding under favorable circumstances of stock not in the highest physical condition, will tend to its improvement. To what degree improvement of the human race might be carried, it is impossible to say with confidence. We do not know our physical history with sufficient exactness to venture far upon such speculations, but, if we take the opinions of a majority of the scientific world of the present day, the race has been constantly improving—in fact, has been developing from some form much inferior. There are many, however, who believe that the Bible account, though perhaps too fragmentary for a scientific basis, is a revelation, and that we were created physically perfect. Accepting this view, to what age did our earliest progenitors survive? This is a question that has not been settled, even by theologians, and therefore will not be discussed here; but, if greater than at present, it might perhaps be recovered by an observance of mental, moral, and physical laws, as tending to the recovery of the normal type of constitution. It is possible that, under any view of the creation of man, human life might be made to increase in length of days, although history shows that its duration has varied but little in 4,000 years.

Moderation and regularity in eating, drinking, and sleeping are conducive to longevity, and those who observe proper habits may accomplish immense labors with no apparent injury to themselves. Scientific studies and philosophical contemplation, if not pursued with too much ardor, do not tend to shorten life. Clergymen are said to be the longest-lived, as a class, of any in England. Poets, as a rule, are not as long-lived as philosophers, although Sophocles is said to have lived 90 years. Goethe was in his 84th year when he died, and Wordsworth was 80; but these two poets were also philosophers, and spent much time in calm thought. Of the old philosophers, Zeno died at 98, Demosthenes at 99, Isocrates at 98, while Hippocrates, the father of medicine, lived to upwards of 100. Many medical men have lived to an advanced age, but it appears from statistics that physicians are, as a class, shorter-lived than members of other professions. Moses lived to the age of 120, and Joshua to that of 110, and their lives were lives of great activity. As an instance of hereditary longevity, may be mentioned that of Abraham, who lived to 175, Isaac to 180, Jacob to 147, and Joseph to 110. Some physiologists do not place reliance on records of longevity much beyond 100 years. Many instances, however, seem to be too well attested to admit of much doubt that individuals have lived to more than 140 years of age, and one of the cases given in some of the records which follow, that of Henry Jenkins, who is said to have lived to the age of 169, rests on evidence which many intelligent men do not feel justified in rejecting. The cases of the three Hungarians may be regarded as doubtful, but they are accepted by the author of the article "Age" in the *American Cyclopædia*, and they are given here, at all events, as interesting records. It must be admitted that there are no valid reasons for denying that life may be prolonged to the extent there claimed. Much of the evidence regarding the age to which individuals attain would, in most instances, be deemed insufficient in a court of law, and, if absolute proof be required, the collection of instances of great age would be small.

Buffon says that every animal lives six or seven times as long as the period of its growth, and Flourens remarks that this is very near the truth, he placing the relative terms of growth and perfected growth as 1 to 5. Both Buffon and Haller placed the normal term of life between 90 and 100 years. They afterwards, by the collection of instances, placed its extreme limit at a little less than two centuries, and Flourens adopts the idea that extraordinary extension of the term of life may go on to one-half more than the ordinary term. The late sir Henry Holland believed that there was sufficient proof of the frequent prolongation of human life to 110 and 140 years; but a recent writer, Mr. Thoms, maintains that any evidence that any human being ever attained the age, not of 140, but of 110 years, will be found upon examination to be untrustworthy, and there are others who to a certain extent share this opinion.

In a work called *The Code of Health and Longevity*, by sir John Sinclair (6th ed., Lond., 1844), and which contains much interesting matter, there is the following: "In a Dutch dictionary entitled *Het Algemeen Woonderbok*, there is an account of which the following is a translation. Petratsch (Peter) Czartan was born in 1537 at Kofrok, a village 4 m. from Temeswaer, in Hungary. When the Turks took Temeswaer from the Christians, he kept his father's cattle. A few days before his death he walked with the assistance of a stick to Kofrok. He had but little sight, and his beard was of a greenish white color, like moldy bread, and but few of his teeth remained. His son, 97 years of age, was born of his father's third wife. Being a Greek in religion, the old man was a strict observer of fasts, and never used any food but milk and cakes. He had descendants in the fifth generation, with whom he sometimes sported, carrying them in his arms. He died in 1724, at the age of 184 years. Count Wallis had a portrait taken of this old man when he fell in with him previous to his death. The Dutch envoy, then at Vienna, transmitted this account to the states-general." There is a picture of the old man in sir John's book, probably a copy

of the portrait of him which count Wallis had taken. The same book also contains portraits of an old married pair, also natives of Hungary. The following is a translation of the inscription on the picture: "John Rovin in the 173d year of his age, and Sarah, his wife, in the 164th year of her age. They have been married 147 years, and both born and died at Stadova, in the directory of Casanseber, in Temeswaer; their children, two sons and two daughters, are yet alive. The youngest son is 116 years of age, and has two great grandsons, the one in the 35th and the other in the 27th year of his age." Henry Jenkins, of Elberton, in Yorkshire, Eng., lived to the age of 169 years. At the age of between 10 and 12 he was sent to North Allerton with a horse load of arrows previous to the battle of Flodden, which was fought Sept. 9, 1513, and as he died Dec. 8, 1670, he must have been of the age reputed. "He had often been sworn in chancery and in the courts to above 140 years of memory." Sir John further remarks, "Little is known of his mode of life, excepting that towards the last century of it he was a fisherman, and not only used to wade the streams, but actually swam rivers after he was past the age of 100 years." Thomas Parr was born in the parish of Alherbury, in Shropshire, in 1483, in the reign of Edward IV., and died in London in 1635. "He lived in the reign of ten kings and queens, and was buried in Westminster abbey." He is said to have been a man of very different stamina from the rest of mankind, for a person who had seen him describes him thus: "From head to heel of his body he had, all over, a quick-set, thick-set, nat'ral hairy cover" (Sinclair). Sir John's book also contains portraits of the countess of Desmond, as well as of Jenkins and Parr. The countess of Desmond lived to the age of 140 years. Sir John says "she was a daughter of the Fitzgeralds of Drummond, in the county of Waterford, and in the reign of Edward IV. married James, 14th earl of Desmond." After his death, sir Walter Raleigh says, she held her jointure from all the earls of Desmond during her life. It is also said, on the authority of lord Bacon, that she twice renewed her teeth. In Bailey's *Records of Longevity* (Lond. 1747), there are, among others, the following records: "Thomas Hill, of Flitton, Staffordshire, died in 1601, aged 128. He was head steward to three successive earls of Kent. On the floor of the chancel, near the altar, is an effigy in brass of this patriarch. The rev. Mr. Braithwaite, of Carlisle, died in 1754, aged 110 years. He had been in the cathedral 102 years, having commenced as a singing boy in 1652, when eight years old." In a work entitled *Human Longevity*, by James Easton, published at Salisbury, Eng., in 1799, there are recorded the ages of 1712 persons who were said to have lived upwards of 100 years. Easton quotes a table from Hufeland, in which that author says that of 100 human beings who are born, 50 die before the 10th year, 20 between the 10th and 20th, 10 between the 20th and 30th, 6 between the 30th and 40th, 5 between the 40th and 50th, and 3 between the 50th and 60th, leaving only 6 to live above the 60th year. He says, "Haller, who collected the greatest number of instances respecting the age of man, found the relative duration of life to be in the following proportion: Of men who lived from 100 to 110 years, the instances have been 1000; from 110 to 120 there have been 60; from 120 to 130 there have been 29; from 130 to 140 there have been 15; from 140 to 150 there have been 6; and as high as 169, there has been 1 instance. But as this volume probably contains a much more extensive collection of long livers than any preceding work on the subject, I cannot deny myself the satisfaction of compiling from it the following table, similar to Haller's. Of males and females who lived from 100 to 110 years, both inclusive, the instances have been 1310; from 110 to 120 there have been 277; from 120 to 130 there have been 84; from 130 to 140 there have been 26; from 140 to 150 there have been 7; from 150 to 160 there have been 3; from 160 to 170 there have been 2; and from 170 to 185 there have been 3 instances = 1712." The following are among the names and ages mentioned by Easton: St. Patrick, 122; Attila, 124; Lywarch Hên, 150; St. Coemgene, commonly called St. Keiven, the founder, bishop, and abbot of Grandalock, or the seven churches in Wicklow, Ireland, 120; Piastus, king of Poland, 120; Lewis Cornaro, 104; St. Anthony the great, of Coma, in Egypt, 105; Jane Scrimshaw of the parish of Bow, 127; Alexander Stephens of Banffshire, 108; Donald Cameron of Kinnichlabar in Rannach, Scotland, 130, and who married at the age of 100; Mrs. Carter, of Waltham abbey, Essex, 101, who could walk five or six miles a day with ease till within a few months of her death; Dr. William Broughridge of Charles Street, Westminster, formerly one of the masters of the Charter house school, 112; Mrs. Keithe, of Newnham, Gloucestershire, "who lived moderately, and retained her senses till within fourteen days of her death, at 133 years, and who left three daughters, the eldest aged 111, the second 110, and the youngest 109; Peter McDonald lived to the age of 109 (his father died at 116, and his grandfather at 107 years); Thomas Winslow, aged 146, of the county of Tipperary, Ireland, a colonel in the army and had held the rank of captain in the reign of Charles I.; he also accompanied Oliver Cromwell into Ireland; Mr. Dobson, of Hatfield, a farmer, who by much exercise and temperate living prolonged his life to the age of 139 years: ninety-one children and grandchildren attended his funeral; Elanor Spicer, of Accomac, Virginia, lived to the age of 121 and worked at sewing till within six months of her death; Andrew Vidal, a native of Brazil, lived to the age of 124; he had 30 sons and 5 daughters, and in 1773 was living in the same house with his children and grandchildren, who numbered 149; John Weeks, of New London, Conn., died at the age of 114; married his tenth wife when he was 106 years old, she being only 16, it is said

that his hair and teeth were partially renewed." Easton also includes the names taken from Sinclair's book above mentioned. There died at Scottsville, Monroe county, N.Y., in the autumn of 1878, Mrs. Melissa Ganier, whose age is probably correctly given. She was married in 1789 at the age of 14, and removed in 1801 to the place where she died. She was, consequently, about 104 years old. Her husband survived her, at the age of 107. They had 95 descendants. At Norristown, Penn., Dec. 28, 1878, Mrs. Elizabeth Thomas died in her 102d year. At West Gloucester, Essex county, Mass., Oct. 26, 1878, Miss Mehitable Haskell died at the age of 89 years. She was the last of nine children who lived beyond fourscore years, one sister attaining the age of 96. The father, grandfather, great-grandfather and great-great-grandfather, all lived beyond 80 years. The influences affecting the longevity of men appear to have been so balanced that the average age of the human race has remained about the same for more than 4,000 years. But in this balancing process there is a depressing and life-shortening influence which necessarily reduces the natural average. It must, therefore, be concluded that a removal of all physically depressing and noxious influences would increase the longevity of the human race. The degenerating influences appear to exist in the cities, chiefly in consequence of the production of poisonous malaria and of infectious diseases, and if it were not for the constant regeneration of the population of cities by accessions from the country the age to which men usually live would be soon greatly shortened and there would be degeneration of race unless considerable reforms were made in sanitary affairs. The registrar-general of Great Britain in a recent report, in alluding to the sanitary condition of that country, says, "Within the shores of these islands 28,000,000 of people dwell who have not only supplied her (England's) armies and set her fleets in motion, but have manufactured innumerable products and are employed in the investigation of scientific truths and the creation of works of inestimable value to the human race. These people do not live out half their days. A hundred and forty thousand of them die every year unnatural deaths; two hundred and eighty thousand are constantly suffering from diseases which may be prevented. Their strength is impaired in a thousand ways; their affections and intellects are disturbed, deranged, and dimmed. Who will deliver the nation from these terrible enemies? Who will confer on the inhabitants of the United Kingdom the blessings of health and long life?" We will conclude this article with a condensed statement of the opinions of Dr. Benjamin Rush (q.v.), surgeon-general of the American army of the revolution, contained in his *Medical Inquiries and Observations*, several editions of which were published at the commencement of this century. He reviews the circumstances which favor longevity, the condition of body and mind which attends it, and the peculiar diseases of old age, and their remedies. The most important circumstance is descent from long-lived ancestors. He says, "I have not found a single instance of a person who has lived to be 80 years old in whom this was not the case. In some instances I have found the descent was only from one, but in general it was from both parents. Dr. Franklin, who died in his 84th year, was descended from long-lived parents. His father died at 89 and his mother at 87. His father had seventeen children by two wives." Intemperance in eating, Dr. Rush found in his experience, was even more prejudicial to longevity than intemperance in drinking, for he met only one man 84 years of age who had been intemperate in eating, but four or five who had been intemperate in the use of ardent spirits. He considers that literary pursuits are favorable to long life. "Business, politics, and religion, which are the objects of attention of men of all classes, impart a vigor to the understanding which by being conveyed to every part of the body tends to produce health and long life." In regard to the married state he met with only one person over 80 years of age who had never been married. He makes particular mention of a woman, a native of Herefordshire in England, who was in the 100th year of her age, and who had born a child at 60. She had suckled successive children at the same time. Dr. Rush remarked that immigrants from Europe often acquired fresh vigor from change of climate and occupation, and probably a prolongation of life. His observations did not indicate that acute or chronic diseases shortened life, and mentions the fact that "Dr. Franklin had two successive vomicas (cavities containing purulent matter) in his lungs before he was 40 years old." It is not improbable, however, that his lung difficulty did shorten his life. He met with one man 86 years old who had suffered all his life from syncope, but he met with but one person beyond the age of 80 who had ever had a disease of the stomach. Mr. John Strangeways Hutton, who died in Philadelphia, in the 109th year of his age, informed Dr. Rush that he had never vomited in his life. "He was born," says Dr. Rush, "in New York city in the year 1664. His grandfather lived to be 101, but was unable to walk for 30 years before he died, from excessive corpulence. His mother died at 91. He had a fixed dislike of ardent spirits of all kinds; his appetite was good, and he ate plentifully during the last years of his life, but rarely drinking between meals. He married twice, having eight children by his first, and seventeen by his second wife. He was about 5 ft. 9 in. in stature, slender, and carried an erect head to the last years of his life. He says, "I have not found the loss of teeth to affect the duration of life so much as might be expected. Edward Drinker, who lived to be 103 years old, lost his teeth thirty years before he died, from drawing the hot smoke of tobacco into his mouth through a short pipe." He makes the observation that "more women live to be old than men, but more men live to be *very* old than women. In regard to the characteristics of

the body and mind of old people he mentions their great sensitiveness to cold, and says, "I met with an old woman who slept continually under three blankets and a coverlet during the hottest summer months. The servant of prince de Beaufremont, who came from Mont Jura to Paris at the age of 121 to pay his respects to the first national assembly of France, shivered with cold in the middle of the dog-days when he was not near a good fire. The late Dr. Chovet, of this city (Philadelphia), who lived to be 85, slept in a baize night-gown under eight blankets and a coverlet, in a stove room many years before he died." He remarks that death from old age is the effect of a gradual palsy, showing itself first in the eyes and ears, then in other parts of the body, reaching the brain the last.

LONGFELLOW, HENRY WADSWORTH, an American poet, was b. at Portland, Me., on Feb. 27, 1807. At the age of 14 he entered Bowdoin college, Brunswick, and graduated there with high honors in 1825. For a short time he studied law in his father's office; but a professorship of modern languages having been founded in the Bowdoin college, and offered him, he accepted it, and proceeded to Europe to qualify himself for the discharge of his new duties. He returned to America in 1829. His first substantive work, *Outre Mer*, appeared in 1835; and in the same year he was appointed to the chair of modern languages and literature at Harvard university. He again spent a year in Europe, and made himself acquainted with the Danish and other northern literatures—an acquaintance which he has turned to noble account. In 1839 he published *Hyperion*, a prose romance, and *The Voices of the Night; Ballads and other Poems*, in 1841; *Poems on Slavery*, 1842; *The Spanish Student*, 1843; his *Poets and Poetry of Europe*, 1845; *Belfry of Bruges*, 1846; *Evangeline*, 1847; *Kavanagh*, 1849; *The Seaside and the Fireside*, 1850; *The Golden Legend*, 1851; *Hiawatha*, 1855; *Miles Standish*, 1858; *Tales of a Wayside Inn*, 1863; trans. of *Dante*, 1867; *Aftermath*, 1873; *The Hanging of the Crane*, 1874; *Pandora*, 1875; *Keramos*, 1878, etc. In 1869 he was made D.C.L. of Oxford.

Of the American poets, Longfellow is the most popular in England, and, at the same time, he is the most national. If his countrymen have not a national epic, *Evangeline* or *Hiawatha* is as yet the nearest approach to it. Some of his shorter lyrics are almost perfect in idea and expression. His poetry is deficient in force, but full of picturesqueness; and a certain quaintness of fancy is one of its most delightful attributes.

LONGFELLOW, HENRY WADSWORTH (*ante*), was the son of Stephen, an eminent lawyer of Portland, Me. While a student in Bowdoin college he wrote some of the best known of his earlier poems, among them the *Hymn of the Moravian Nuns;* the *Spirit of Poetry; Woods in Winter*, and *Sunrise on the Hills.* He held his professorship at Harvard 17 years, resigning in 1854, but continuing to reside at Cambridge, in the house occupied by Washington when the revolutionary army was encamped in that neighborhood. He spent the summer of 1842 at Boppard on the Rhine. In 1868–69 he revisited Europe, and was everywhere the recipient of high honors, especially in England, where his writings are exceedingly popular. Men of the highest literary and social distinction sought his acquaintance and were charmed by his dignified, kindly, and unassuming deportment. The general verdict upon his poetry is that, while it fails to represent the deepest passions of human nature, it is always kindled by the broadest sympathies, and marked by a delicate appreciation of all that is beautiful in nature and noble in humanity. Keenly sensitive to the imperfections and misdoings of men, he is never censorious, but always gentle and persuasive, appealing to the sympathies and motives which are common to people of every race, country, and clime. He exhibits the fruits of a broad culture, not in strained allusions to things beyond the reach of common readers, but in the clearness and simplicity with which he interprets to them the noblest thoughts of the noblest men of every age and country. Among his latest works are *Poems of Places*, selected from a great number of authors and filling 31 small volumes; and *Ultima Thule*, a volume of original poems.

LONGFELLOW, SAMUEL, b. Portland, Me., 1819; brother of Henry Wadsworth; graduated at Harvard college in 1839, and at the divinity school in 1846; from 1853 to 1860 was pastor of the Second Unitarian church in Brooklyn, resigning in order to go to Europe. After his return to America he resided many years at Cambridge, Mass., preaching frequently in Unitarian pulpits, but for most of the time devoted chiefly to literary pursuits. In 1878 he became pastor of the Unitarian church in Germantown, Penn., where he remains. He belongs to what is called the "left wing" of the Unitarian denomination, the section holding views most variant from the evangelical. In 1847, in association with the rev. Samuel Johnson and the rev. Samuel Osgood, he compiled *A Book of Hymns*, jocularly called the "Sam Book," but very highly esteemed both upon literary and religious grounds, and which was afterwards revised and published with the title of *Hymns of the Spirit.* In 1859 he published a book of *Hymns and Tunes for Congregational Use.* He has written a number of hymns marked by devoutness of feeling as well as a cultivated literary taste, and some of his fugitive poems are very highly esteemed. His published sermons and essays are remarkable for elevation of tone, for clearness of insight, and purity of style.

LONGFORD, an inland co. of the province of Leinster, Ireland, lying between Leitrim and Cavan on the n., Westmeath on the e. and s., and Roscommon on the w.; 29 m. long from n. to s., and 22 m. from e. to west. Its area is 269,409 acres, of which 191,823 are arable; population in 1871, 64,501. The surface is for the most part moist and flat,

with the exception of a slightly elevated central range, the greatest elevation of which is only 912 feet. Many small lakes pervade the county, and the river Shannon, or its nursing lakes, connect Longford with the county and city of Limerick. Its navigation is also connected with Dublin by the Royal canal, which traverses the county to the town of Longford, and terminates in the river Shannon at Clondra; and there are two branches of the Midland Great Western railway which pass through the county, from Mullingar to Longford and Cavan. The south of the county forms part of the central limestone district of Ireland. The north is a continuation of the clay-slate which prevails in Cavan, the two districts being separated by a belt of yellow sandstone and conglomerate, which projects from the east of Leitrim. Deep beds of marl are found in many of the boggy districts. Marble of good quality is also found, and ironstone, with coal, shale, and lead, of good quality, but not in remunerative quantity. The limestone district of the south is suited to tillage, and produces excellent wheat. The north is chiefly devoted to pasture. The number of acres under crop in 1876 was 72,859. In the same year, there were 59,933 cattle, 33,221 sheep, and 22,254 pigs. The chief towns are Longford (q.v.), Granard, and Ballymahon. Longford returns two members to parliament. The number of national schools, in 1871, was 132, attended by 7,305 pupils; in 1875 there were 14,060 pupils (13,232 being Catholics). Longford anciently formed part of the kingdom of Meath, and as such was included in Henry II.'s grant to Hugh de Lacy. It was erected into a county in 1564, but in the rebellion of 1641 it was recovered for a brief period by the O'Farrells, and, on the suppression of this rising, almost the entire county was distributed as confiscated lands to a new race of colonists. The antiquities are of much interest. The islands of Lough Ree are especially rich in monastic remains.

LONGFORD, capital of the above county, 75 m. w.n.w. from Dublin by the Midland Western railway, on a small river called the Camlin. It is a well-built town. The Roman Catholic cathedral, recently erected, is a very spacious, and, indeed, a magnificent building, of the Ionic order. Pop. '71, 4,375, of whom 3,473 were Roman Catholics, 645 Protestant Episcopalians, and the rest Protestants of other denominations. The chief commerce of Longford is in the agricultural produce of the district. No manufacture of any importance exists in the town. It is connected with Dublin and with Sligo by the Midland Western railway, as also with the former by the Royal canal.

LON'GHI, GIUSEPPE, 1766–1831; b. at Monza, near Milan; studied at the school of engraving there, became professor in 1798, and subsequently for several years the head of the institution. In 1801, by invitation of Bonaparte, he took part in the Cisalpine council at Lyons, going afterwards to Paris. His chief works are the "Vision of Ezekiel," after Raphael; the "Magdalen" of Correggio; the "Madonna del lago," after Leonardo da Vinci; and "Galatea," after Albano. He engraved many fine heads, among them those of Washington, Michael Angelo, and Napoleon. The plates known as the "Facti di Napoleone il Grande" are among his masterpieces. His latest biography was published by Baretta in 1837. Died at Milan.

LONGICOR'NES, a family of tetramerous coleoptera, containing a vast number of species, among which are many of the largest and most splendid beetles. They are remarkable for the length of their slender antennæ, which are often longer than the body. They all feed on vegetable food, some on leaves, some on roots, and are mostly inhabitants of forests; the females depositing their eggs, by means of a long, strong, horny ovipositor, beneath the bark of trees, on the wood of which the larvæ feed. The longicornes abound chiefly in warm countries, and particularly in South America; the number of British species, however, is considerable, but some of those so reckoned have probably been imported from foreign countries in the larva state, in timber, to which they often do great injury.

LONGI'NUS, DIONYSIUS CASSIUS, a Platonic philosopher and famous rhetorician, was b., according to some, at Emesa, in Syria, and according to others, at Athens, about 213 A.D. In his earlier years, he traveled a great deal in the company of his parents, and made the acquaintance of many celebrated scholars and philosophers. He studied Greek literature at Alexandria, where he was for a considerable time the pupil of Ammonius and Origen, and subsequently settled as a teacher of rhetoric in Athens, where he soon acquired a great reputation. His knowledge was immense: he was called a "living library" and a "walking museum," but his taste and critical acuteness were no less wonderful. He was probably the best critic of all antiquity. In an age when Platonism was giving place to the semi-oriental mysticism and dreams of Neoplatonism, Longinus stands out conspicuous as a genuine disciple of the great master. Clear, calm, rational, yet lofty, he despised the fantastic speculations of Plotinus, who consequently would not admit that Longinus was a philosopher, but—since he stooped to criticise the diction and style of Plato—pronounced him a mere philologist. In the latter years of his life, he accepted the invitation of Zenobia to undertake the education of her children at Palmyra; but becoming also her prime political adviser, he was beheaded as a traitor, by command of the emperor Aurelian, 273 A.D. Longinus was a heathen, but a generous and tolerant heathen. Of his works, the only one extant (and even that one only in part) is a treatise, *Peri Hypsous* (On the Sublime). There are many editions of Longi-

nus's treatise, of which those by Morus (Leip. 1769), Toupius (Oxf. 1778, 2d ed. 1789, 3d ed. 1806), Weiske (Leip. 1809), and Egger (Paris, 1837), are among the best. See also Ruhnken's *Dissertatio de Vita et Scriptis Longini.*

LONGIPEN'NES, in Cuvier's ornithological system, that section of the order *palmipedes* characterized by long wings and great power of flight. The wings are often very narrow. They are all sea-birds, and many of them venture to a great distance from shore. Their hind-toe is small and free, or wanting. They cannot dive and pursue their prey under water, but they swim well, and their movements in the air are very graceful. Petrels, shearwaters, gulls, terns, noddies, skimmers, and albatrosses are examples.

LONGIROS'TRES, a tribe of birds of the order *grallæ*, having generally a long, slender, feeble bill, and inhabiting sea-shores and marshy places, where they seek worms and other food in the mud or ooze. To this tribe belong snipes, woodcocks, curlews, godwits, sandpipers, etc.

LONG ISLAND, an island which forms three counties of the state of New York, between lat. 40° 33′ to 41° 6′ n. and long. 72° to 74° 2′ w., bounded n. by Long Island sound, e. and s. by the Atlantic ocean, and w. by the bay and harbor of New York. It is 115 m. long, and 12 m. in average width, with an area of 1682 sq. miles. On its s. shore is a bay 100 m. long, and from 2 to 5 m. wide, separated from the ocean by a narrow beach of sand, with several inlets. On this shore are several lighthouses, and 30 life-boat stations. A line of hills runs along the northern portion of the island, but the center is a plain, sloping to the sea. Villages, watering-places, and fertile farms line the coasts, but the interior is mostly waste land and forest. The principal towns are Brooklyn (opposite New York), Flushing, Jamaica. The shores are lined with watering-places for summer resort. This island was once inhabited by 13 Indian tribes. Aug. 22, 1776, sir Henry Clinton landed on Long Island with 9,000 British troops, defeated gen. Putnam, and compelled Washington to evacuate the island. Pop. '70, 540,648

LONG ISLAND (*ante*), an island belonging to the state of New York, embracing the three counties of Kings, Queens, and Suffolk. It lies between 40° 34′ and 41° 10′ n. lat., and between 71° 51′ and 74° 4′ w. longitude. It is bounded s. and e. by the Atlantic ocean, n. by Long Island sound, and w. by the bay of New York and the East river. Its length is about 125 m., its average width 14 m.; area, 927,900 acres; pop. '80, 744,022. The coast is indented with many bays and inlets, abounding with shell and other fish. One of these is Peconic bay, 30 m. long, which divides the eastern end of the island into two parts or projections, the one on the n. side terminating at Oyster Pond point, that on the s. terminating at Montauk point, 20 m. farther east. On the s. side of the island is a bay nearly 100 m. long and from 2 to 5 m. broad, formed by the Great South beach, a strip of white sand from one-fourth of a mile to a mile in width, with occasional openings to the ocean. Near the western end of the island are Jamaica, Hempstead, Oyster, and Huntington bays. Shelter, Gardiner's, Fisher's and Plumb islands, in the adjacent waters, are attached politically to Long Island. The coasts, bordering as they do on the track of an immense ocean commerce, are furnished not only with a large number of lighthouses, but with life-saving stations, provided with every means of rendering aid to vessels in distress. The surface, though presenting considerable variety, is marked by no great elevations. A range of hills extends, with frequent interruptions, from the northern boundary of New Utrecht in the w. almost to the eastern extremity of the island on the n. side of Peconic bay. These hills are considerably nearer to the northern than to the southern margin of the island. North of them the surface is uneven and rough, while on the s. it has a gradual inclination toward the sea, and is broken here and there by wide sandy plains producing only coarse grass and stunted shrubs. Some of these plains, by the application of manures, have of late years been brought under cultivation. A considerable portion of the island is in forest, from which wild game has not yet been wholly exterminated. There are numerous springs and small streams, and many ponds, some of them quite large, while swamps and marshes abound. The largest stream is the Peconic, which, after a course of 15 m., empties into the bay of the same name. It furnishes numerous mill seats. Of salt marsh the island is computed to contain more than 100 sq.m. With the exception of the sandy plains above mentioned the soil is for the most part fertile, in some sections peculiarly rich. Much of it is in a high state of cultivation, being devoted to the production of vegetables for the Brooklyn and New York markets. This is especially true of the two westernmost counties, Kings and Queens. The climate, on account of the influence of the sea, is milder and more equable than the same latitude in the interior, the mercury seldom falling below zero or rising above 90°, the average temperature being about 51°. The highest elevations on the island are Hempstead Harbor hill at Roslyn, and West hill in Suffolk co., both which are 384 ft. above the sea. On the s. side, Coney island, Rockaway, Quogue, Babylon, Fire island, Southampton, Easthampton, and Montauk point are watering-places, several of which are much frequented in the hot season. Coney island especially, which is but a few miles from New York and Brooklyn, and easily accessible by boat or rail, has within a few years become a place of resort for vast multitudes of people, for whose accommodation immense hotels have

been erected. The Long Island railroad passes through nearly the entire length of the island, from Hunter's Point at the western to Greenport near the eastern extremity, and connects by branches with various places at a greater or less distance from its main track; while there are numerous other and shorter roads, connecting many towns with Brooklyn and New York. Among these are the North Shore, Southern, Flushing and Central, Flushing and North Side, Smithtown and Port Jefferson, New York and Rockaway, Newtown and Flushing, Bay Ridge, Hempstead and Jerusalem, Brooklyn and Jamaica, Brooklyn and Coney Island, etc. Steamboats also ply regularly between New York and the principal towns on the n. side.

The principal cities and towns on the island are Brooklyn, Long Island City, Garden City, Flatbush, New Lots, Flushing, Hempstead, Jamaica, Oyster Bay, North Hempstead, Huntington, Brookhaven, Riverhead, Southampton, and Southold. Brooklyn, at the extreme western extremity of the island, is the third city of the United States in population. It is connected with different parts of New York by eight or ten ferries, and will soon be connected therewith by a magnificent wire suspension bridge, crossing at such a height that only the largest vessels will have to lower their topmost-masts in passing under it. Garden City was founded by the late Alexander T. Stewart, a wealthy merchant of New York, on land formerly known as Hempstead plains, which, since the first discovery of the island had been regarded as almost worthless. Mr. Stewart purchased a tract of 12,000 acres, on a portion of which Garden City has been built, while other portions have been brought under successful cultivation. The city is as yet in an inchoate state; though it contains many fine buildings and a considerable population. One of the objects of the founder was to furnish economical and healthful homes for families of small means, whose heads might be employed in New York. An immense and costly cathedral, for the uses of the Protestant Episcopal church, is nearly completed.

Long island when first discovered was the abode of 13 tribes of Indians, of which the only remnants are some 200 Shinnecooks, a mixed breed of Indians and negroes in Southampton, and a few families of Montauks. The island was included in the grant made to the Plymouth colony by James I. in 1620. In 1625 the first settlement was made by some French Protestants under Dutch protection. In 1636 the Dutch made several settlements at the western end, near New York, but the larger portion of the island, and especially its eastern section, was settled by colonists from Connecticut and other parts of New England. The island was called "Lange Islandt" by the Dutch; in 1693 the English changed it by law to the "island of Nassau"—a name, however, which never came into popular use. In 1636 Jaques Bentyn and Adrianse Bennet purchased of the Indians 930 acres of land within the present boundaries of the city of Brooklyn. Mr. Bennet erected here the first house ever built upon the island, and which was burned by the Indians in 1643. In the troubles which preceded the revolution the people of Long Island were intensely patriotic, but the reverses of the American arms which placed the island in the power of the British during the war made it impossible for them to do much for the cause of independence. One of the earliest battles of the war was fought in Brooklyn, Aug. 26–28, 1776, when the Americans occupying the defensive under gen. Putnam were overcome by a greatly superior British force and compelled to retreat in boats across the East river under cover of a thick fog. The patriotic portion of the inhabitants, left thus under British control, endured many privations and not a little persecution during the whole period of the war.

LONG ISLAND CITY, a city in Queens co., N. Y., at the n.w. extremity of Long Island; formed from a portion of the town of Newtown, and incorporated in 1870; pop. '74 about 16,000. It extends 3 m. e. and w., and 5 m. n. and s., and has a water front of 10 m. along Newtown creek, which separates it from Brooklyn, and thence n. along East river to Bowery bay. It is divided into five wards and has 3 post-offices, viz.: Astoria, Ravenswood, and Long Island City. The s.w. portion is called Hunter's Point, this being the w. terminus of the Long Island, Flushing, and other railroads. The n. portion is the most elevated, and in Astoria and Ravenswood are many fine residences and beautiful drives. The streets and avenues are wide, and provision is made for three public parks. Hunter's Point is connected with New York city by 2 ferries, Astoria by one and by the Harlem boats. Several lines of horse-railroad connect the city with Brooklyn. Hunter's Point is a great depot for the storage and shipment of petroleum. It contains extensive lumber-yards, several oil refineries, granite works, a marine railway, and manufactures of chemicals, cabinet-ware, hammers, boilers, refrigerators, steam-engines, asbestos roofing, mattresses, etc. Astoria has manufactures of pianofortes, carpets, carriages, jewelry, etc. The city has 14 churches, a fine court-house, excellent school-buildings, and 1 daily and 5 weekly newspapers. The courts of the county of Queens are held here, though the various county offices remain at Jamaica, the former capital.

LONG ISLAND SOUND, a body of water between Long Island and New York and Connecticut, 110 m. long, and from 2 to 20 m. wide, commencing narrow at New York city, which it separates from Brooklyn, and where it is called East river, and opening at its eastern extremity into the Atlantic ocean, by a passage called "the Race." It is navigated by an immense number of coasting-vessels and steamers, and is strongly forti-

fied at Throggs point, near New York. It receives the Connecticut, Housatonic, Thames, and Mystic rivers on its northern shore.

LONG ISLAND SOUND (*ante*), an arm of the Atlantic ocean, lying between New York and Connecticut on the n. and Long Island on the s.; about 110 m. in length and from 2 to 25 m. in breadth. Its depth is generally about 70 ft., scarcely anywhere exceeding 120 ft. It is connected with the ocean on the e. by a passage called the Race, and on the w. by the East river, New York bay, and the Narrows. It has many harbors moderately good, and one or two excellent. The Connecticut shore is rocky and reefs impede navigation for a distance from the land: the Long Island shore is less broken. The principal rivers flowing into the sound are the Housatonic, Connecticut, and Thames. The sound is the route of an extensive commerce between New York and the principal cities and towns of New England, and is navigated by many lines of steamers and sailing vessels. The narrow and rock-bound strait called "Hell-gate," at the western extremity of the sound, has made this route practically unavailable hitherto for vessels approaching New York from the ocean, but measures are in progress for widening the channel by the removal of the rocks, and, when this work is fully accomplished, a new and highly advantageous channel for ocean commerce will be opened.

LONGITUDE. See LATITUDE.

LONG LAKE, one of the series of Adirondack lakes, situated in the n.e. part of Hamilton co.; 18 m. in length, and about 3 m. wide. It is remarkable for the beauty of the surrounding scenery, having Buck mountain on the right and the Blueberry mountains on the left, as one enters by way of the Raquette river. From this point a fine view is obtained of Mt. Seward, 4,348 ft. in height, from which the lake is distant 10 miles. The lake itself is at an elevation 1575 ft. above the level of the sea. Its position and its length make it an important part of the interesting and extensive line of travel through successive lakes and streams in the Adirondack region.

LONGLAND, ROBERT. See LANGLANDE.

LONGLEY, CHARLES THOMAS, D.D., 1794–1868; b. in Westmeathshire, England; educated at Westminster school and Christ-church college, Oxford, where he ranked as first-class scholar in classics. After his graduation he continued some time at the university as college tutor, censor, and public examiner. He became perpetual curate of Cowley in 1823; rector of West Tytherly, 1827; head-master of Harrow school, 1829; bishop of Ripon, 1836; of Durham, 1856; archbishop of York, 1860; and of Canterbury, 1862. In this last position, as primate of all England, he continued until his death. The year before he died he presided at the sessions of the Pan-Anglican synod, composed of all the bishops of the church of England and of the churches in communion with it. By some persons archbishop Longley has been described as deficient in firmness and other positive elements of character required especially in his most exalted position, which he held at a difficult time. In person he was amiable, dignified, courteous, and devout. Before his death he referred to words which had been used by bishop Hooker, expressive of his sense of guilt and of his reliance on the blood of Christ to cleanse him from sin, as containing the faith in which he wished to die.

LONGMAN, THOMAS, 1699–1755; b. England; having served an apprenticeship to John Osborne, a bookseller of London, was taken into partnership by him in 1725, in Paternoster row, establishing a business which has since been continued by his successors, on the same site under various firm names—now Longmans, Green, Reader, & Dyer. The style of the firm at one time was Messrs. Longman, Brown, Green, Hurst, Rees, Orme & Longmans. In 1728 he was concerned in publishing, by subscription, the *Cyclopædia* of Ephraim Chambers in 2 large folio volumes, a second edition appearing in less than 10 years, and 5 editions in 18 years. It is, with one exception (the *Lexicon Technicum* of John Harris, 1706–10), the first English encyclopædia or general dictionary of the arts and sciences, subdivided under suitable heads and alphabetically arranged. It subsequently formed the basis of *Rees's Cyclopædia*, 4 vols., 1781–86. He was one of six booksellers who undertook in 1747 to publish a dictionary of the English language in 2 folio vols., and employed Samuel Johnson to perform the work for the sum of 1500 guineas, out of which he paid his assistants. The dictionary was issued complete in 1755, but has been so altered by editors as scarcely to be recognized, in its present guise, as Johnson's.

LONGMAN, THOMAS, 1731–97; b. England; nephew of Thomas (1699–1755), was received into the publishing company of his uncle in 1754, and was the pioneer among exporters of books to America. In 1776 he began to publish a new edition of *Chambers's Cyclopædia*, completed in 1786, 4 vols. folio, edited by Abraham Rees, who became one of the firm, and with whom he was associated in publishing *Rees's Cyclopædia*, 1802–19, in 45 vols.

LONGMAN, THOMAS NORTON, 1770–1842; b. England; for 50 years the head of the publishing firm of Longman & Co. of Paternoster row, London, son of Thomas (1731–97), and grandnephew of the original publisher of that name. In 1792 he became a partner with his father in publishing and selling books, adding greatly to the influence and efficiency of the house as long as his connection with it lasted; admitting various partners during his long career as business manager. In the early years of the 19th c.

they held the copyright of Lindley Murray's *English Grammar*, and brought out the first efforts of Coleridge, Southey, Wordsworth, and others of the lake poets. Prior to 1811 they were Thomas Moore's publishers, with the exception of his life of lord Byron. Scott's *Lay of the Last Minstrel*, and some of the *Waverley* novels were published by them; also the works of Macaulay, Herschel, etc. In 1826 they assisted in publishing the *Edinburgh Review*, and issued 133 vols. of Lardner's *Cabinet Cyclopædia*, 1829–46. He left the business to his sons Thomas and William, under the style of Longmans, Green, Reader & Dyer, who have sustained the distinguished character of the firm.—WILLIAM (d. 1877) was the author of *The History of the Life and Times of Edward III.; Lectures on the History of England, from the Earliest Times to the Death of King Edward II.;* and in 1856 his *Journal of Six Weeks' Adventure in Switzerland, Piedmont, and on the Italian Lakes*, was printed for private circulation. William also wrote a number of articles on entomology, attaining some distinction in that branch of study.

LONGOBARDS. See LOMBARDS and LOMBARDY, *ante.*

LONG PARLIAMENT, the name given to the parliament of England summoned by Charles I. for the purpose of granting him supplies wherewith to carry on his war against his rebellious subjects. It assembled Nov. 3, 1640, and remained in session 12 years, 5 months, and 17 days, when it was dissolved by Oliver Cromwell, April 20, 1653. This parliament impeached and executed the earl of Strafford, abolished the star chamber, and provided against its own dissolution except by its own consent. Finally it drove out of the house of commons those members who remained faithful to the king, dismissed the house of lords, and established a high court of justice, before which the king was brought to trial and sentenced to death, being beheaded on the scaffold Jan. 30, 1649. When Cromwell expelled the remains of the long parliament, he set up another assembly, of nominated members, but in the tumultuous state of public feeling, neither this nor any other of his parliamentary experiments worked satisfactorily.

LONGSTREET, AUGUSTUS BALDWIN, LL.D., 1799–1870; b. Augusta, Ga.; graduated at Yale in 1813; studied law at the celebrated school in Litchfield, Conn., and was admitted to the bar in Richmond co., Ga., in 1815; began his legal practice in Greensborough, Ga., and soon rose to eminence in his profession. In 1821 he was a member of the legislature, and in 1822 made judge of the court in the Ocmulgee circuit, but soon resigned his judicial honors, continued the practice of the law at Augusta, and established there the *Sentinel* newspaper, which in 1838 was consolidated with the *Chronicle*. In 1838 he abandoned the legal profession to become a clergyman, united himself with the Methodist conference of Georgia, and was at once assigned to a pastorate in Augusta. In 1839 he was elected president of Emory college, Oxford, Ga., holding the position until 1848, when he was made president of Centenary college, La., but was soon afterwards transferred to the university of Mississippi at Oxford. He was a member of the general conference held in the city of New York in 1844, and took a conspicuous part in the debates upon the case of bishop Andrew (involving the question of slavery), which ended in a rupture of the M. E. church into the northern and southern bodies. He was an active politician of the state rights democratic school, and a supporter of slavery. Among his writings may be mentioned *Letters from Georgia to Massachusetts; Letters to Clergymen of the Northern Methodist Church;* and *A Review of the Decision of the Supreme Court of the United States in the Case of McCulloch v. The State of Maryland.* His literary writings were of a humorous character, and among these were *Georgia Scenes* and *Master William Mitten, or the Youth of Brilliant Talents who was Ruined by Bad Luck.* Died at Oxford, Miss.

LONGSTREET, JAMES, b. S. C., 1820; appointed to the military academy from Alabama, and after his graduation in 1842 stationed at various points on the Texan frontier until the breaking out of the Mexican war, in which he served with distinction, and was brevetted successively captain and major for gallantry at Churubusco and Molino del Rey. After the war he continued to serve in Texas, becoming paymaster with the rank of major in 1858. On the outbreak of the rebellion he threw up his commission, and entered the confederate service. He commanded the 4th brigade of Beauregard's 1st corps, participating in the first battle of Bull Run. Promoted to a major-generalship in 1862, he distinguished himself in the campaigns under Lee against Pope, McClellan, Burnside, and Meade. After the battle of Fredericksburg, Dec. 13, 1862, he was made a lieutenant-general. He led the confederate right at Gettysburg, and being sent by Lee to the relief of Bragg, carried the day at Chickamauga, Sept. 19, 20, 1862. In Nov. of the same year he drove Burnside into Knoxville, to which he laid siege; but he was compelled to withdraw after the federal victory at Chattanooga, and join Lee in Virginia. He took a distinguished part in the operations in the Wilderness, till severely wounded, May 6, 1864, but recovered in time to resume command of his corps during the siege of Petersburg. At the close of the war, whose results he was one of the first southerners to accept, he devoted himself to the development of the southern railroad system. Afterwards separating himself from the majority of his former associates, he accepted office under a republican administration, becoming in 1869 surveyor of the port of New Orleans. In 1875 he removed to Georgia, and in 1880 was sent to Turkey as U. S. minister.

LONGSTREET, WILLIAM, 1760–1814; b. N. J. Removing to Georgia, he conceived, as soon as, or before Fulton, the idea of propelling boats by steam, and in 1790 applied to the governor of Georgia for means to carry out his plan. His application was refused, but some time afterwards he succeeded in building a small boat, which went up the Savannah river at a speed of 5 m. an hour. He was also the inventor of the "breast-roller" improvement of the cotton-gin, working by horse-power. He built two of these to run by steam at Augusta, but they were burned, as were the steam mills which he subsequently built at St. Mary's.

LONG'TON, a t. of Staffordshire, England, in the district of the Potteries. Longton was incorporated as a municipal borough in 1865. It is about 2 m. s.e. from Stoke, on a small stream, which falls into the Trent, and is on the line of the North Staffordshire railway. Part of the town is known as LANE-END. The growth of the town has been rapid, and is entirely due to the manufacture of china and earthenware, in which the inhabitants are chiefly employed. Pop. '61, 16,690; '71, 19,748.

LONGUEVILLE, ANNE GÉNEVIÈVE DE BOURBON-CONDÉ, Duchesse de, 1619–79; b. in the donjon of Vincennes, where her father, Henry III. of Bourbon, was a prisoner. Her mother was Charlotte de Montmorency, sister of the great Condé. Before arriving at womanhood her beauty and grace, and a singularly sympathetic attraction, made her *début* at the court a social event. She was at once a pupil and a star in the choice society gathered around the marquise de Rambouillet. In 1642, at the age of 23, she became wife of the duc de Longueville, an old *roué*, who deserved and received no love from his young wife. She was strongly attached to Coligny, who was killed in a duel by the duc de Guise. In 1646, her husband being ambassador at Munster, the duchess was already so renowned for her charms that her reception was like an ovation to a monarch; but she speedily tired of the vulgar show, and returned to the more elegant and refined circles of Paris. The duc de Rochefoucauld, author of the *Maximes*, became her ardent admirer and favorite. Up to this time she had exhibited only the power to charm the most eminent men by a singular blending of languor and sweetness of manner. The internal troubles of France generated a strong animosity between the French parliament and cardinal Mazarin, regent of Louis XIV., and developed into a civil war, called the war of the Fronde. The duchess participated in the popular hatred of Mazarin and espoused the other side. From this time she appears in a *rôle* which exhibits energy, powers of intrigue, and ability of a high order. La Rochefoucauld's ascendency over her heart and her mind awakened her to political ambition. She became the soul and bond of alliance between the various friends of the parliament, and supported the acts of the citizens of Paris, who rose against Mazarin and by barricades forced his flight from the city. With the duchesse de Bouillon installed in the Hotel de Ville, she aided to keep Paris in the possession of the insurrectionists against the regent. During this time she gave birth to a child, alleged to be a son of La Rochefoucauld. She was an active party to the treaty of peace with Mazarin in 1649. Soon after, her husband was imprisoned in Vincennes, and she flew to Normandy to effect a rising of the people against Mazarin, but failed. She then sought safety for herself and fled to Holland, and thence to the great general, Turenne, at Stenau, and soon acquired an ascendency over him which for a time made him untrue to his government, and in the end led to the submission of the duchess to Mazarin and her return to Paris. For a short time she returned to the literary and social frivolities of the Hotel Rambouillet; but her uncle Condé and prince Conti, her brother, having again broken with the Mazarin government, she joined them at Bourges and Bordeaux, where the democratic character of the supporters of their cause was like bitter water to her taste. Her party fell apart; her brother Conti and La Rochefoucauld made their separate peace with the government; Condé fled to Spain; and the duchess returned to Paris, pardoned through the efforts of her husband in her behalf. She immediately after went into retirement from society and politics, but was soon required by her husband to join him in Normandy, where he was governor. Seeking to avoid publicity, as she then was, Mazarin was still suspicious of her, and in a conversation with the Spanish ambassador, who plead the cause of her brother Condé, he said: "You Spaniards can talk at your ease; your women only trouble themselves with affairs of love; but in France it is quite another thing, for we have three who are quite capable to govern or to overturn three kingdoms—the duchesse de Longueville, the princess Palatine, and the duchesse de Chevreuse." The death of her husband in 1663 only induced her to greater seclusion, and, though she lived in Paris, her presence was only felt in her occasional mediation to ameliorate the condition of the Protestants, and to avert the hostility of the Catholic power towards them. Her son, born in 1649, had opened a brilliant career, and had even been called to the throne of Poland, when she had news of his death in battle, June, 1672. She retired to the convent of the Carmelites, but continued the friend of the Jansenists; and when their persecution was renewed, it was under her roof that "the grand Arnoult" was successfully hid. For 25 years after this, Mme. de Longueville lived in tranquillity, rendering as obscure as possible the beauty which never left her, and performing the gracious acts of kindness which her life, in the midst of the *religieuses*, gave opportunity to do. M. Victor Cousin has written the *Memoires de Madame de Longueville*, in 3 vols., with a care that gives it one of the highest places in French biography.

LON'GUS, a Greek sophist of the 4th or 5th c. of the Christian era, author of a novel, *Daphnis and Chloe*, which was translated into English by G. Thornley, London, 1657, and of which an edition appeared in Leipsic as late as 1835.

LONG VACATION, a period of the year in England when suits cannot be carried on, but are for some purposes suspended—viz., from Aug. 10 to Oct. 24 at common law, and to Oct. 28 in chancery in every year. Hence it is called the lawyer's holiday.

LONGVIEW, a t. in Gregg co., Texas, on the Sabine river, at the junction of the Texas and Pacific with the International and Great Northern railroad; 66 m. w. of Shreveport, La. Pop. 2,000. It has 4 churches, 1 banking-house, and a number of schools, and is a shipping-point of some importance. Cotton is the staple product of the region, and there are in the immediate vicinity over 40 saw-mills. Incorporated as a village in 1871.

LONGWORTH, NICHOLAS, 1782–1863; b. N. J.; removed to Cincinnati, where he was admitted to the bar, and practiced for a quarter of a century, when he retired, devoting himself to vine culture, in which he had become interested as early as 1828. He succeeded in producing excellent varieties of native wine. He had early invested largely in Cincinnati real estate; the rise in the value of which caused a large part of the great fortune, estimated at $15,000,000, which he left at his death.

LONGWY, a t. in the n. of the department of Moselle, France, near the left bank of the Chiers, a tributary of the Meuse; on a railway 40 m. n.w. of Metz, and a mile from the Belgian frontier; pop. 4,197. It consists of an upper and lower town. The former is on a hill, where anciently stood a strong castle, which was destroyed and replaced in the time of Louis XIV. by a town. This is fortified, well built, has a town-hall, churches, a hospital, a military prison, and several deep wells which supply it with water. The lower town has manufactures of calico, delft-ware, porcelain, table-covers, lace, and leather. Longwy was founded in the 7th century. It has sustained many sieges. In 1792 it was taken by the Prussians under the duke of Brunswick; in 1815 by the allies under the prince of Hesse-Homburg, after a vigorous resistance. Longwy was called by Louis XIV. *The Iron Gate of France.*

LONI'GO, a t. of the Italian states, in the province of Vicenza, situated in a valley 12 m. s.w. of the city of that name. It is protected by three strong towers, the antiquity of which is attested by the inscription they bear. The inhabitants, 6,786 in number, are chiefly devoted to agriculture and commercial industry.

LÖNN'ROT, ELIAS, b. Finland, 1802; at first followed his father's trade of a tailor, and was for a time apprentice to a druggist, but subsequently studied medicine, receiving the degree of M.D. in 1832. He practiced for a time, but in 1853 became professor of Finnish at the university of Helsingfors. In 1835 he published a collection of the popular songs of East Finland, under the name of *Kalevala*, and in 1842 a collection of popular proverbs.

LONOKÉ, a co. in e. central Arkansas, formed in 1870 from portions of Prairie and Pulaski counties, and bounded n. by Cypress bayou. It is traversed by the St. Louis, Iron Mountain and Southern, and the Memphis and Little Rock railroads. The soil is fertile; much of the surface is in forest. Pop. '80, 12,147. Capital, Lonoké.

LONS-LE-SAUNIER, a t. of eastern France, in the department of the Jura, at the confluence of the Seille, Vallière, and Solman, about 55 m. s.e. of Dijon. It is situated in a beautiful valley, surrounded by vine-clad hills, and was founded as long ago as the 4th c., when its salt springs were discovered, from which 20,000 quintals of salt are yearly extracted. Pop. '76, 11,265. Rouget de Lisle, the composer of the *Marseillaise*, was born here.

LOO-CHOO, or LIU-TCHIU, the native name of a group of islands called by the Chinese Liéu-kiéu, and by the Japanese Riu-kiu. These islands, about 90 in number, lie in the Pacific ocean, about 400 m. off the coast of China, lat. 24° to 29° n., long. 127° to 129° east. The largest and most southern, called Great Lu-tchu, or Okinawa, is about 65 m. long and 13 broad. Its shores have a beautiful appearance; fields and forests are clothed with a living green, pine-woods crown the summits of the hills, and gardens and cornfields adorn their slopes. In loveliness and variety of landscape, as in the careful attention paid to agriculture, especially in the southern part of Great Lu-tchu, which looks like one vast enchanting garden, few places anywhere could surpass these islands. The principal products of the group are rice, millet, sugar, cotton, tobacco, indigo, and tea; of less importance, bananas, pine-apples, oranges, peaches, and plums. Domestic animals are very numerous—ducks, geese, swine, goats, cattle, and horses. The chief minerals are iron, coal, and sulphur, probably also copper and tin. Sugar, and a liquor called *saki*, distilled from rice, are exported to Japan. The manufacturing industry of the inhabitants is as great as the agricultural. They make paper, cloths, coarse linens, earthen and lacquered wares, bricks, tobacco-pipes, and baskets.

The people are partly Japanese and partly an aboriginal tribe closely allied to the Japanese stock, although the literature and customs of the islanders are Chinese. The population was in 1872 estimated to amount to 166,789. Their religion is chiefly a mixture of the doctrines and practices of Confucius with those of Buddha. The govern-

ment, as in China, appears to be in the hands of an aristocracy of learned men, and the king is said to be related to the imperial family of Japan. The islands (with an area of 2,658 sq.m.) are tributary to Japan. In 1851 a Christian mission was founded by Dr. Bettelheim, a German physician, who has introduced vaccination.

LOODIA'NA, a district of British India, one of the three districts into which the division of Ambala, or Umballa, in the Punjab is divided. It lies in the 77th degree of e. long., extending in n. lat. from 30° 34′ to 31° 2′; and, with an area of 1359 sq.m., it contained in 1868 a population of 583,245 souls—an average of nearly 428 persons to the sq. mile.

LOODIA'NA, the capital of a district of the same name in British India, takes its name from the Lodi tribe of Afghans, and is situated 1,102 m. n.w. of Calcutta, in lat. 30° 55′ n., and long. 75° 54′ east. It stands on a navigable nullah or stream, which joins the Sutlej from the e., about 15 m. below the town. Pop. '68, 39,983, mostly weavers. The principal manufactures are cotton-cloth and Cashmere shawls, the latter, however, being inferior in quality to those made in Cashmere itself. Loodiana is a military station of some importance. Over the Sutlej a bridge was opened in Oct., 1870, to connect the Delhi and Lahore railways.

LOOF, the after-part of a ship's bow, or that portion where the planks incurvate towards the cut-water. The guns mounted in this portion of the vessel are styled "loof-pieces."

LOOKING-GLASS. See MIRROR.

LOOM, the machine by which weaving is effected. The art of weaving is coeval with civilization, therefore the loom may be reckoned amongst the earliest of man's inventions; yet notwithstanding its vast age very little improvement was effected in it until the invention of Dr. Cartwright in 1787, who, without ever having seen a loom in his life before, constructed one to work by machine-power. In its simplest form, the loom is worked by hand, and notwithstanding the wonderful improvements which have been effected in the power-loom since its invention, there are still many fabrics manufactured by hand-looms in this and other countries.

In India, which most probably is the native country of the loom, and where silks of almost unrivaled beauty are made, the natives continue to use this machine in its most primitive form; two trees growing near together form their standing frame, and a few pieces of bamboo, together with some pieces of string, furnish all they want besides.

As the use of the loom will be fully explained in the article WEAVING, the construction only will be given here; but it is necessary, in order to make this clear, to explain the principle of weaving, in order to show the work the loom has to do. In its simplest sense, weaving consists in passing one set of threads traverseiy through another set, divided into two series, working alternately up and down, so as to receive the transverse threads in passing, and interlock them, forming thereby a united surface out of the threads. The loom is made to assist the weaver in this operation, and is of no other use than to hold the working parts in their proper position. The native of India supplies this usually by selecting, as before stated, two near-growing tree-stems, usually palms, in consequence of their straightness; these, with four stakes to support his warp, and two or three pegs to fix his heald-ropes, complete his arrangements.

At each end of the frame, two rollers are placed, so that they will readily turn on their axes; and from one to the other, the threads of the warp are attached, and kept tight by weights. The warp-threads are wound round one roller, which is called the *beam* or *yarn-roll*, only as much of each thread being left unwound as will reach to the other roller, which is the *cloth-beam*, to which the ends are fastened, and upon which the cloth is wound as it is woven.

The next step is to divide the warp-thread into two equal sets by raising up every alternate one, and inserting between them a smooth rod of wood, to prevent them entangling or returning to their former position. This separation takes place before the final fixing of the ends of the threads to the *cloth-beam*, because, previous to that, each thread must be passed through a small loop in a perpendicular thread called the heald, which hangs down from a rod. There are always two sets of healds in the simplest form of loom, often many more; and in the case of plain weaving, the threads of the warp are divided alternately by the loops of each heald, so that if one heald is raised, it lifts every alternate thread of the warp, and if the other is depressed, it pulls down the opposite set of threads; the united action of the two healds opens a space between the two sets of warp-threads. This space is called the shed, and through it is thrown the shuttle which carries the thread of the weft; when the weft has passed through, the healds are reversed, and the lower warp-threads now become the upper ones. The threads, after each intersection, are driven up tight by the reed, which is a narrow frame with transverse wires set sufficiently far apart for a single thread of warp to pass through each; it hangs to the frame called the batten. The movement of the batten is produced by the hand of the weaver, whilst that of the healds is readily effected by the treadles.

Many improvements have been made in this the simplest form of loom, but the chief has been in replacing the weaver's hand in the necessary operation of throwing the shut-

tle by a mechanical arrangement. Without this, the *power-loom* would not have succeeded. The shuttle is usually made of box or some other hard wood, and the blunt points are covered with iron. Formerly, when used entirely by the hand, it was made much lighter and smaller than at present. Those now in use are about a foot in length, and rather more than an inch square in the middle. The middle part is hollowed out into a small box, open on the upper side. In this box the bobbin, on which the yarn or thread is wound, is placed, with its two ends on pivots, admitting of its being turned by the slightest strain on the yarn; the end of the yarn passes through a hole in the side of the shuttle, and as it is thrown backwards and forwards, the thread unwinds from the inclosed bobbin, and easily runs through the hole.

In the improved looms for power, and even in those still worked by hand, in special cases the arrangement for projecting the shuttle backward and forward is very simple. On each side of the loom, exactly in a line with the *shed*, is a groove of about 18 in., in which the shuttle lies free; and there is a very simple arrangement by which a piece of leather and a strap are made to act like a sling on each side; and the grooves or *shuttle-races*, as they are called, guide the movement with such precision that the shuttle is sent flying through the shed from side to side with unerring exactness. Great simplicity and compactness has now been attained in the power-loom, three of which can stand in the space occupied by one of the cumbrous machines formerly in use. There are few machines in use which have had more mechanical ingenuity displayed in their improvement than the loom; but as it is not the object of this article to do more than give the general principles upon which the machine works, the reader is referred for fuller information to the thick volume of the *Abstract of Patents* for weaving published by the patent commissioners.

LOOMIS, ELIAS, LL.D., b. in Connecticut in 1811, educated at Yale college, graduating in 1830; was tutor there for three years, 1833–36; spent the next year in scientific investigation in Paris, where he made a careful study of astronomy, meteorology, and higher mathematics; on his return was appointed professor of natural philosophy in the Western Reserve college, Ohio; from 1844 to 1860 held similar positions in Columbia college and the University of New York, and in the latter year returned to New Haven, where he has since resided, holding the professorship of natural philosophy formerly occupied by prof. Olmsted, in Yale, and pursuing his investigations in scientific and mathematical branches. He has published—besides many papers in the *American Journal of Science*, memoirs of his researches, in the *Transactions of the American Philosophical Society*, and other miscellaneous writings—a very complete set of text-books on mathematics, including treatises on arithmetic, algebra, elements of geometry and conic sections, analytical geometry and calculus, plane and spherical trigonometry, and tables of logarithms; also, a treatise on astronomy and one on meteorology. All of these are in constant use in schools and colleges throughout the country, and are marked by the accuracy and precision which are characteristic of the author personally. He has also published a book of family genealogy, *The Descendants of Joseph Loomis* (1870). Both as an instructor and writer, prof. Loomis is remarkable for his clearness and directness in expression, and his contributions to the cause of education have not been confined to formulating truths already known, as he has made many important scientific discoveries and advanced many new theories.

LOOMIS, GUSTAVUS, 1789–1872; b. at Thetford, Vt.; graduated from the U. S. military academy in 1811; entered the army as 2d lieut. of artillerists, and, after doing garrison duty in the harbor of New York for two years, was ordered to the Niagara frontier; assisted in the capture of fort Dodge, May 27, 1813, and was made prisoner at fort Niagara in the following Dec. After the war with Great Britain he served in various capacities in different parts of the country, especially in Texas and Florida, and on the western frontier against hostile Indians; was made col. of the 5th infantry in 1851; during the first years of the rebellion he was employed in court-martial and recruiting duty and as a mustering officer; retired from active service in 1863; made brig.gen. by brevet in 1865. Died at Stratford, Conn.

LOON. See DIVER.

LOOPHOLES, in fortification, are small apertures in the walls, through which sharpshooters may fire. The loophole should widen towards the outside, that the shooter may have a sweep with his rifle; and it is of importance, on that account, so to fashion the sides that a bullet may not penetrate, unless fired straight into the center. For this purpose, the stones are generally laid stepwise, although other forms are frequently resorted to.

LOPE DE VEGA. See VEGA.

LO'PES, or LOPEZ, FERNÃO, b. Portugal about 1380; the oldest of the Portuguese chroniclers; was appointed chief archivist of the kingdom by Dom Joao I., and devoted his life to the collection of materials for the history of his country. He wrote a work, *Chronica del Rey Dom Joao I.*, describing the great struggle between Portugal and Castile towards the close of the 14th c., which, as a picture of manners, has been compared with that of Froissart for accurate and dramatic reality. His other works are *Chronica do Senhor Rei Dom Pedro I.; Chronica do Senhor Rei Dom Fernando*, both

printed in vol. iv. of the *Collecçao de Livros Meditos de Historia Portugueza*. These works are regarded by eminent scholars as of great literary and critical value.

LO'PEZ, CARLOS ANTONIO, 1790–1862; b. Paraguay. After studying civil and canon law at the ecclesiastical seminary in Assuncion, he lived for a number of years in seclusion to avoid the hostility of Dr. Francia, then dictator of Paraguay. Upon Francia's death in 1840 he returned to the capital, and acted as secretary to the military junta which had become the *de facto* government of Paraguay. In 1841 he was elected consul, with a colleague; from 1844 till his death he held the office of president, to which the congress had elected him for a term of ten years from 1844, of three years from 1854, and of seven years from 1857, with power in the latter case to name his successor by will. During his administration he began the organization of an army and navy, opened Paraguay to foreign emigration and commerce, made commercial treaties with foreign powers, built a railroad, and sent many Paraguayans to Europe to be educated. His arbitrariness and hostility to foreigners gave rise to many diplomatic difficulties between Paraguay and foreign states; and England, France, the United States, and Brazil came very near declaring war against him. But his administration, on the whole, was a period of internal tranquillity and material prosperity to Paraguay, and at his death he was able to bequeath his power to his son, Francisco Solano Lopez.

LO'PEZ, FRANCISCO SOLANO, 1827–70; b. Paraguay; educated abroad, and in 1845 appointed commander-in-chief of the Paraguayan army. In 1854 he was sent to Europe on a diplomatic mission, and negotiated treaties with England, France, and Sardinia. In Europe he made the acquaintance of a Mrs. Lynch, the Irish wife of a French officer. Lopez took her to Paraguay with him, and made her his mistress. She was a woman of considerable talent and force of character, and exercised a great influence over Lopez. He at once took the office of minister of war, and began to prepare secretly for a forcible annexation to Paraguay of parts of Brazil, the Argentine Republic, and Bolivia. In 1862 he succeeded his father in the presidency, and in 1864, under the pretense of protecting the "equilibrium" of the Plata river, he called on Brazil to withdraw her troops from Uruguay, where a civil war was in progress, in which Brazil had intervened. Upon the refusal of Brazil, he took possession of the Brazilian province of Matto Grosso. In 1865 he invaded the Brazilian province of Rio Grande do Sul, sending 8,000 troops through the territory of the Argentine Republic for that purpose, and, upon that government protesting, he declared war against it. Congress now conferred upon him extraordinary powers, and he invaded the Argentine Republic before the declaration of war had reached Buenos Ayres. Brazil, Uruguay, and the Argentine Republic entered into an alliance against him, and in 1866 invaded Paraguay. The war continued four years, Lopez recruiting his forces by a conscription of all persons between the ages of 12 and 70. In 1868 the Brazilian fleet bombarded Assuncion, and the same year Lopez arrested and put to the torture many of the civil officers of the government and the foreign diplomatic corps on a charge of conspiracy. A number were executed, and the lives of some of the members of the American mission were saved only by the timely arrival of an American squadron. Finally, Mar. 1, 1870, Lopez, who had gradually been driven into the n. of Paraguay, was overtaken by the Brazilian cavalry at the Aquidaban river, and, while trying to swim across, was killed. His last words were, "I die for my country." His eldest son was also killed; his mistress, Mrs. Lynch, was spared, and returned to England. The remnant of his forces immediately surrendered.

LO'PEZ, NARCISO, 1799–1851; b. Venezuela. After serving in the Spanish army, in which he attained the rank of col., he removed to Cuba upon the evacuation of Venezuela by the Spanish troops, and became a liberal leader. He was in Spain during the first Carlist insurrection; and sided with the royalists, receiving office from the crown. In 1849 he came to this country to organize an expedition against Cuba, where he landed in 1851, but was soon taken prisoner and put to death.

LOPHIADÆ. See ANGLER.

LOPHI'ODON, an extinct genus of ungulate mammals, belonging to the family *tapiridæ*, of which the genus *tapirus* is the only surviving member. Their remains are found in the eocene tertiary formation of central Europe. Some 15 species of lophiodon are known. They much resembled the tapirs, but possessed distinctive dental characteristics, the formula being: *i.*, $\frac{3-3}{3-3}$; *c.*, $\frac{1-1}{1-1}$; *pm.*, $\frac{3-3}{3-3}$; *m.*, $\frac{3-3}{3-3} = 40$,—the tapir having *i.*, $\frac{3-3}{3-3}$; *c.*, $\frac{1-1}{1-1}$; *pm.*, $\frac{4-4}{3-3}$; *m.*, $\frac{3-3}{3-3} = 42$, or two more molars than in lophiodon. The limbs of the animal are still unknown. The genus has not been satisfactorily identified in America, but the species, which abounded in Europe during the eocene, varied in size from that of a rabbit to a rhinoceros. Other genera of tapiridæ are *hyracotherium*, *pachynolophus*, *pliolophus*, *lophiotherium*, and *propalæotherium*, found in European eocene. In North America the nearest allies of lophiodon are *helates* and *hyrachius*. The latter genus has four premolars in the upper jaw, resembling the true tapirs. The premolars resemble those of lophiodon in being less complex than the molars. In the North American miocene the tapiridæ belong to the genus *tapiravus*. See PERISSODACTYLA; TAPIR; UNGULATA.

LOPHOBRAN'CHII, an order of osseous fishes, having the ultimate divisions of the gills not pectinated, but arranged in small tufts in pairs along the branchial arches. There is nothing like this in any other fishes. The fishes of this order are few, mostly of small size, angular form, and peculiar aspect. See HIPPOCAMPUS and PIPE-FISH. The gill-cover is large, and the gill-opening is a small hole. The snout is elongated and tubular.

LOQUAT, *Eriobotrya Japonica*, an esteemed Chinese and Japanese fruit, of the natural order *rosaceæ*, sub-order *roseæ*, and of a genus closely allied to *mespilus* (Medlar). It has been introduced into Australia, and is now abundant there, and is sold in large quantities, and at a cheap rate, in the markets of Sydney and other towns. The tree or shrub which produces it attains a height of 20 or 30 ft., but in cultivation is seldom allowed to exceed 12 feet. It is a beautiful evergreen, with large oblong wrinkled leaves, and white flowers in terminal woolly panicles, having a fragrance like that of hawthorn-blossom; the fruit is downy, oval, or pear-shaped, yellow, and about the size of a large gooseberry. The seeds have an agreeable flavor, which they impart to tarts. The loquat lives in the open air in the s. of England, and produces fruit; but a warmer climate is required for fruit of fine quality. It is not unfrequent in hot-houses. It may be grafted on any species of *mespilus*.—The species of *eriobotrya* are all evergreen. The CUILA (*E. elliptica*) is a native of Nepaul, and produces an eatable fruit.

LORAIN', a n. co. of Ohio, bounded n. by lake Erie; traversed by the Lake Shore and Michigan Southern, the Lake Shore and Tuscarawas Valley, the Cleveland and Toledo, and the Cleveland, Columbus and Cincinnati railroads; pop. 30,308. It has a fertile soil, and the chief productions are live stock, grain, fruit, wool, hay, butter, and cheese. There are manufactures of cheese, lumber, clothing, carriages, furniture, harness, metallic ware, etc. Capital, Elyria.

LORANTHA'CEÆ. See MISTLETOE.

LORCA (ancient *Eliocroca*), a t. of Spain, province of Murcia, 40 m. s.w. of the city of that name, on the right bank of the Sangonera, is picturesquely situated on an eminence crowned by a fortified castle commanding a magnificent view. Next to Murcia, Lorca, is the most flourishing town in the province, possessing substantial houses, 8 churches, 9 monasteries, many oil and flour mills, saltpeter and powder works, lead-mines, and manufactures of cotton, etc. Pop. 31,000.

LORD (Saxon *hlaford*, from *hlaf*, loaf, and *ord*, a beginning or cause—i.e., the originator or supplier of food), a title given in Great Britain to persons noble by birth or by creation. Peers of the realm are so styled, including such archbishops or bishops as are members of the house of lords, who are lords spiritual. By courtesy, the title lord is given to the eldest sons of dukes, marquises, and earls, prefixed to an inferior title of the peerage, and to the younger sons of dukes and marquises, prefixed to their Christian name and surname. The following persons bear the title lord in virtue of their employments: the lord-lieutenant of Ireland and lords-lieutenant of counties (see LIEUTENANT, LORD), the lord chancellor (see CHANCELLOR), lord privy seal (see PRIVY SEAL), lords of the treasury (see TREASURY) and of the admiralty (see ADMIRAL), the lord high admiral, lord great chamberlain, and lord chamberlain (see CHAMBERLAIN, LORD), lord high constable (see CONSTABLE), lord high almoner (see ALMONER), lord high steward (see STEWARD), lord steward of the household, lords in waiting, lords of the bedchamber (see BEDCHAMBER, LORDS OF THE), lords justices (see JUSTICES, LORDS), the lord chief baron of exchequer (q.v.), the lord chief justice (see JUSTICE, LORD CHIEF), the lord lyon (see LYON KING AT ARMS), the lord mayor of London, York, and Dublin (see MAYORS), and the lords provost of Edinburgh and Glasgow (see PROVOST). The committee of the Scottish parliament by whom the laws to be proposed were prepared, were called lords of the articles. The favored beneficiaries, who, after the Scottish reformation, obtained in temporal lordship the benefices formerly held by bishops and abbots, were called lords of erection. Persons to whom rights of regality were granted in Scotland (see REGALITY), were termed lords of regality. The representative of the sovereign in the general assembly of the church of Scotland (see ASSEMBLY, GENERAL) is called the lord high commissioner. The judges of the courts of session and justiciary in Scotland have the title "lord" prefixed to their surname or some territorial designation assumed by them; and throughout the three kingdoms, judges are addressed "my lord" when presiding in court.

LORD, ELEAZAR, LL.D., 1788–1871; b. Franklin, Conn., and educated at Andover, Mass.; removed in 1809 to New York, where in 1812 he entered the ministry of the Presbyterian church. He was among the founders of the American education society for assisting poor young men in their preparations for the Christian ministry, the New York Sunday-school union, and various other benevolent associations; was corresponding secretary of the New York Sunday-school union 1818–26, and president 1826–36. In 1818 he left the ministry to engage in banking; founded the Manhattan insurance company, and served as its president 1821–34; was the first president of the Erie railroad company; removed in 1836 to Piermont, N. Y.; was a prominent friend of the New York university, and assisted in founding theological seminaries at East Windsor, Conn., and Auburn, N. Y. His principal works are *Principles of Currency; Geology and Scrip-*

tural Cosmogony; and an edition of Lemprière's *Biographical Dictionary*, with numerous additions. Died at Piermont.

LORD, JOHN, LL.D., b. at Portsmouth, N. H., 1810; graduated at Dartmouth college in 1833; was for some time an agent of the American peace society, and subsequently a preacher in New Marlboro', Mass., and Utica, N. Y. A few years later he left the pulpit to devote himself to historical research and popular lecturing. Beginning his new career in England and Scotland, he returned to the United States in 1846, since which time he has been engaged with great success in lecturing upon historical subjects in the principal cities and towns of this country. Destitute of the special gifts and graces of an orator, he yet crowds his lectures with information and delivers them in a manner so peculiar as to command the unflagging interest of his audiences.

LORD, NATHAN, D.D., LL.D., 1793–1870; b. in South Berwick, Me.; graduated at Bowdoin college 1809, and at Andover theological seminary 1815; was pastor of a Congregational church at Amherst, N. H., 1816–28, and president of Dartmouth college, 1828–63. After the formation of the American antislavery society in 1833 he was for a time an abolitionist and even elected as an officer of that society, but later changed his position, avowing his belief that "slavery is an institution of God according to natural religion," and "a positive institution of revealed religion." Although his opinions on this subject were very distasteful to the friends of the college in general, yet, on account of his many estimable personal qualities, he was for a long time undisturbed in his place at the head of the institution. Died at Hanover, N. H.

LORD ADVOCATE OF SCOTLAND. See ADVOCATE.

LORD OF THE MANOR, the owner of a manor having copyhold tenants. See MANOR.

LORD ORDINARY. See COURT OF SESSION.

LORD'S DAY, in point of law, has been made the subject of several statutes. The chief statute in England is the *Lord's-day act*, 29 Ch. II. c. 7, which enacted that no tradesman, artificer, workman, or laborer should exercise the worldly labor, business, or work of his ordinary calling upon the Lord's day (works of necessity and charity only excepted), nor any person should publicly cry, or expose to sale, wares, fruits, herbs, etc.; but nothing in the act was to extend to prohibiting the dressing of meat in families or inns, cook-shops, or victualing-houses, nor the selling of milk within certain hours. To these exceptions, selling mackerel and baking bread were added subsequently. These statutes have been construed strictly by the courts on the ground that they restrain the liberty of the subject, for, without a statute, ordinary work would be as competent on the Sunday as on any other day. Hence, unless a case comes within the strict letter of the statute, there is no disability. Thus, a horse may be sold on Sunday by one who is not a horse-dealer, for then it is not part of the seller's ordinary calling. So a farmer may hire a servant on that day; indeed, the statute does not apply to farmers, attorneys, surgeons, and those not included in the above statutory description, and therefore those parties can do their work on Sunday as on other days. Irrespective of any statute, it has been the immemorial course of practice in courts of law not to do legal business on Sunday, and not to recognize the service of writs, warrants, etc., of a civil nature, if made on Sunday. Thus, no debtor can be arrested for debt on Sunday, and hence he may walk at large that day, free from molestation of bailiffs. But if any crime has been committed, the party can be arrested on Sunday as well as other days. There is a special provision by statute as to ale-houses, beer-houses, and refreshment-houses being open on Sundays, the general effect of which is only to close these places during church hours. If any game is pursued on Sunday, whether by poachers or not, a penalty is incurred. There is also a statute of 1 Ch. I. prohibiting sports or pastimes of certain descriptions. Except as above-mentioned, there is no difference made as to the validity of acts done on Sunday, though it is an erroneous popular impression that deeds or wills, bills of exchange, etc., dated or executed on Sunday are invalid.

In Scotland, the law varies in some respects from that of England on this matter. There also contracts made on Sunday are not null at common law, but numerous statutes have passed prohibiting contracts, whether made in the course of one's ordinary business or not, and whether made by workmen, artificers, etc., or not. But there is an exception of works of necessity and mercy. It is, however, doubtful how far these old statutes are in desuetude or not, and judges have said that they only apply to public, not private acts done on Sunday. In Scotland, the rule is acted on that the enforcement of decrees and warrants, poindings, and other process or diligence in civil matters, are void; but it is otherwise in criminal matters. It is singular that there is no distinct penalty imposed in Scotland, as there is in England and Ireland, by the game acts, on persons sporting on Sunday. But Scotland outstrips England and Ireland in the stringency with which public-houses are prohibited from being open on that day. See PUBLIC-HOUSES.

LORD'S DAY, THE (*ante*), the first day of the week, on which Christ rose from the dead; synonymous in popular speech with Sunday or Sabbath. This name is generally used in the English and American statutes intended to secure the civil observance of the day. English legislation on this subject may be traced as far back as 1449, but it

was not until 1678 that the law was passed which may be regarded as the foundation and model of all subsequent enactments of its class in Great Britain and the United States. By this law it was enacted "that no tradesman, artificer, workman, laborer, or other person whatsoever, shall do or exercise any worldly labor, business, or work of their ordinary callings upon the Lord's day or any part thereof (works of necessity and charity only excepted);" and "that no person or persons whatsoever shall publicly cry, show forth, or expose to sale, any wares, merchandise, fruits, herbs, goods, or chattels whatsoever, upon the Lord's day or any part thereof." In the American colonial days the state assumed jurisdiction of religious as well as civil affairs; hence much of the Sunday legislation of that period has either been repealed or become dead from disuse. It is now generally conceded that with the Lord's day, regarded simply in its religious aspects, the state has no concern. It cannot require a citizen either to attend public worship or to observe any religious ceremony on that day. But it is held that the day is indispensable, needed by the community, upon purely secular grounds, and must, therefore, be maintained by government. A day of rest from ordinary labors and cares, recurring not less frequently than once in each week, is held to be requisite to the general welfare of body, mind, and estate; therefore, it is insisted that the government has the right and the duty to designate such a day and to enforce its observance. Moreover, those who observe the day upon religious grounds, making it a day of public as well as private devotion, are, it is conceded, entitled to protection from the noise and disturbance which would result from the general pursuit of business on that as on other days of the week. The laws upon this subject in the different states of the union, though resting substantially upon common ground, differ in details, and the decisions of courts upon questions that have arisen under them are in some respects conflicting. The whole subject has been greatly complicated of late years by the introduction into the country of large bodies of immigrants from continental Europe, whose habits in respect of Sunday observance are much less rigid than those of the great body of our native population. It is probable that, on this account, the laws upon the subject may undergo some further modifications, but there is no reason to fear that the state will cease to maintain the institution of the Lord's day as a day of rest from business cares, or to protect from disturbance those who hold it sacred on the highest grounds of morality and religion. The manifest tendency to increase greatly the facilities of travel by railroad and steamboat on the Lord's day is causing alarm of late, and awakening earnest protest. It is felt—religion aside—that this country cannot afford, either morally, physiologically, or pecuniarily, to lose its one day of peace. Though the protest against the degradation of the day bases itself thus on secular considerations, and finds immense strength in these, it will probably be found that the real force of all successful efforts for the maintenance of the day, on even civil grounds, must spring ultimately from a religious—a distinctively Christian—source.

LORDS, HOUSE OF. See PARLIAMENT.

LORD'S-SUPPER, THE, is one of the sacraments of the Christian religion (see SACRAMENT). It is so called from its being instituted at supper by Jesus Christ, whom his disciples styled the Lord or Master. It receives also the names of eucharist and communion (q.v.). With the exception of the Quakers, all sects of Christians, however different their views as to its nature, agree in celebrating it as one of the most sacred rites of religion. The present article is written from the point of view of those who admit more or less the idea of a historical development of the doctrines connected with the Lord's-supper; the views of Roman Catholics, who hold that the doctrines of their church on the subject were delivered by our Lord and his apostles, and have from the first centuries been taught in substance in the church, will be found under other heads. See MASS; TRANSUBSTANTIATION.

The circumstances of sorrow amid which it was instituted, and its intimate relation to the crowning work of Jesus, his death, had, at the very outset, made a deep impression upon the early church. Not only was the solemnity, in conformity with its original institution, repeated daily in conjunction with the so-called *Agapæ* (q. v.) (love-feasts), and retained as a separate rite when these feasts were set aside; but from the very first it was believed to possess a peculiar efficacy, and soon ideas of the wonderful and mystical became associated with it. The Lord's-supper was celebrated on every important occasion of life—when entering on marriage, when commemorating departed friends and martyrs, etc.; to those that could not be present at the meeting of the congregation, such as prisoners, sick persons, and children, the indispensable food of heaven was carried by the deacons, and in some churches—those of Africa, for instance—the communicants took part of the materials of the feast home with them, that they might welcome the gift of a new day with consecrated food. Heathens also and unworthy persons were excluded from this holy mystery. As early as the 2d c., Ignatius, Justin Martyr, and Irenæus advance the opinion that the mere bread and wine became, in the eucharist, something higher—the earthly, something heavenly—without, however, ceasing to be bread and wine. Though these views were opposed by some eminent individual Christian teachers, such as Origen (died 254), who took a figurative conception of the sacrament, and depreciated its efficacy; yet both among the people and in the ritual of the church, more particularly after the 4th c., the miraculous or supernatural view of

the Lord's-supper gained ground. After the 3d c., the office of presenting the bread and wine came to be confined to the ministers or priests. This practice arose from, and in turn strengthened the notion which was gaining ground, that in this act of presentation by the priest, a sacrifice, similar to that once offered up in the death of Christ, though bloodless, was ever anew presented to God. This still deepened the feeling of mysterious significance and importance with which the rite of the Lord's-supper was viewed, and led to that gradually increasing splendor of celebration which, under Gregory the great (590), took the form of the mass. See MASS. As in Christ two distinct natures, the divine and the human, were wonderfully combined, so in the eucharist there was a corresponding union of the earthly and the heavenly.

For a long time there was no formal declaration of the mind of the church on the presence of Christ in the eucharist. At length, in the first half of the 9th c., a discussion on the point was raised by the abbot of Corvei, Paschasius Radbertus, and Ratramnus, a learned monk of the same convent; they exchanged several violent controversial writings, *De Sanguine et Corpore Domini*, and the most distinguished men of the time took part in the discussion. Paschasius maintained that the bread and wine are, in the act of consecration, transformed by the omnipotence of God into that very body of Christ which was once born of Mary, nailed to the cross, and raised from the dead. According to this conception, nothing remains of the bread and wine but the outward form, the taste, and the smell; while Ratramnus would only allow that there is some change in the bread and wine themselves, but granted that an actual transformation of their power and efficacy takes place. The greater accordance of the first view with the credulity of the age, its love of the wonderful and magical, as well as with the natural desire for the utmost possible nearness to Christ, in order to be unfailingly saved by him, the interest of the priesthood to add luster to a rite which enhanced their own office, and the apparently logical character of the inference, that where the power, according to universal admission, was changed, there must be a change also of the substance; the result of all these concurring influences was, that when the views of Ratramnus were in substance revived by Berengarius, canon of Tours, in opposition to Lanfranc, bishop of Canterbury, and cardinal Humbert, the doctrine of transubstantiation, as it came to be called, triumphed, and was officially approved by the council of Rome in 1079. In the fourth Lateran council at Rome, 1215, under Innocent III., transubstantiation was declared to be an article of faith; and it has continued to be so held by the Roman Catholic church to the present day. The Greek Catholic church sanctioned the same view of transubstantiation at the synod of Jerusalem in 1672.

The reformation of the 16th c. again raised the question on the nature of the eucharist. The Lutheran church rejected from the first the Catholic doctrine of transubstantiation, as well as of the mass, i. e., the constant renewal of the sacrifice of Christ, and merely taught that, through the power of God, and in a way not to be explained, the body and blood of Christ are present in, with, and under the unchanged bread and wine. In opposition to this doctrine, it was laid down by Zwingli, that the Lord's-supper is a mere commemoration of the death of Christ, and a profession of belonging to his church, the bread and wine being only symbols: a view which is adopted in substance by the Socinians, Arminians, and German Catholics. Luther bitterly opposed the symbolical view, especially towards the latter part of his career; Zwingli's doctrine was more repugnant to him than the deeper and more mystic Catholic doctrine. See IMPANATION.

Calvin sought to strike a middle course, which has been substantially followed by the reformed churches. According to him, the body of Christ is not actually present in the bread and wine, which he also holds to be mere symbols. But the "faithful" receiver is, at the moment of partaking, brought into union with Christ, through the medium of the holy Spirit, and receives of that heavenly power (efficacy) which is always emanating from his glorified body in heaven. Melanchthon, in this controversy, was inclined to the views of Calvin; but he thought a union might be effected by adopting the declaration that Christ in the eucharist is "truly and really" present (not merely in faith). The endeavors of Melanchthon and his party, by arbitrary alterations of the Augsburg confession, and other means, to effect a public reconciliation, only served to rouse among the partisans of Luther a furious theological storm, and the result was the establishment of the peculiar views of Luther, and the final separation of the Lutheran and reformed churches.

The whole controversy relates to the *mode* in which the body and blood of Christ are present in the Lord's-supper; for it was agreed on all hands that they are present in some way. The reformed theologians argued that *presence* is a relative term, opposed not to distance, but to absence; and that presence, in this case, does not mean local nearness, but presence in efficacy. Here they parted company both with the Roman Catholic church and with the Lutherans. They were willing to call this presence "real" ("if they want words," as Zwingli said), meaning true and efficacious, but they would not admit corporal or essential presence. But while the reformed churches were at one in holding that, by receiving the body and blood of Christ, is meant, receiving their virtue and efficacy, there is some difference in their way of expressing what that efficacy is. Some said it was their efficacy as broken and shed—i.e., their sacrificial efficacy; others, in addition to this, speak of a mysterious supernatural efficacy flowing from the glorified body of Christ

With regard to the reformed churches, it may be remarked that their confessions on this point were mostly formed for the express purpose of compromise, to avoid a breach with the Lutherans. Hence the language of these confessions contains more of the mystical element than the framers of them seem, in other parts of their writings, to favor. And it is remarkable that the Anglican confessions, which were framed under different circumstances, lean more to the symbolical view of Zwingli than those of any other of the reformed churches. The thirty-nine articles, after laying down that "to such as with faith receive the same, it is a partaking of the body of Christ," repudiate the notion of transubstantiation; and add: "The body of Christ is given, taken, and eaten in the supper only after an heavenly and spiritual manner. And the mean whereby the body of Christ is received and eaten in the supper is faith."

The Presbyterian church of Scotland adopted substantially the views of Calvin. The words of the Westminster confession are: "That doctrine which maintains a change of the substance of bread and wine into the substance of Christ's body and blood (commonly called transubstantiation) by consecration of a priest, or by any other way, is repugnant not to Scripture alone, but even to common sense and reason. . . . Worthy receivers, outwardly partaking of the visible elements in this sacrament, do then also inwardly by faith, really and indeed, yet not carnally and corporally, but spiritually, receive and feed upon Christ crucified, and all benefits of his death: the body and blood of Christ being then not corporally or carnally in, with, or under the bread and wine: yet as really, but spiritually, present to the faith of believers in that ordinance, as the elements themselves are to their outward senses."

This variety of dogmatical opinion as to the eucharist naturally gave rise to variety in the ceremonials of its observance. The Catholic notion of a mysterious transformation, produced the dread of allowing any of the bread and wine to drop, and led to the substitution of wafers (*hostiæ oblatæ*) for the breaking of bread. The doctrine of the "real union," which declares that in the bread as well as in the wine, in each singly and and by itself, Christ entire is present and tasted—a doctrine which was attested by wafers visibly bleeding—caused the cup to be gradually withdrawn from the laity and non-officiating priests; this practice was first authoritatively sanctioned at the council of Constance, 1415. All the reformed churches restored the cup: in the Greek church it had never been given. From the same feeling of deep reverence for the eucharist, the communion of children gradually came, after the 12th c., to be discontinued. The Greek church alone admits the practice. Grounded on the doctrine of transubstantiation, the Greek and Roman Catholic churches hold the "elevation of the host" (*hostia*, victim or sacrifice) to be a symbol of the exaltation of Christ from the state of humiliation; connected with this is the "adoration of the host," and the carrying it about in solemn procession. The use of leavened bread in the Greek church, and of unleavened in the Roman Catholic and Lutheran, of water mixed with wine in the Roman Catholic and Greek churches, and of unmixed wine in the Protestant churches, are trifling differences, mostly owing their origin to accidental circumstances; yet once magnified into importance by symbolical explanations, they have given occasion to the hottest controversies. The greater part of the reformed churches agree in breaking the bread and letting the communicants take it with the hand (not with the mouth); and this practice is owing to the original tendency of those churches to the symbolical conception of the eucharist, in which the breaking of the bread and the pouring out of the wine are essential elements.

Although the great divisions of the Christian world have continued as churches to adhere to those doctrines about the Lord's-supper which were fixed and stereotyped in acts of council and articles and confessions about the time of the reformation, we are not to suppose that the opinions of individuals within those churches continue equally uniform and fixed. Even Roman Catholic theologians, like Bossuet, have sometimes endeavored to understand the doctrine of the church in a philosophical sense; and in the Lutheran church, the greatest variety of opinion prevails. Some uphold unmodified the dogmas of Luther; others accept them with explanation; Hegel even undertook to ground them on speculative reason. Others, as Schleiermacher, would have recourse to the views of Calvin as a means of reconciliation with the reformed churches. Even all "supernatural" theologians do not adhere strictly to the formulas of the church; while rationalism in all its phases tends to the pure symbolism of Zwingli.

The Anglican church is divided on this, as on several kindred topics, into two parties: with one, the symbolical view of the rite is predominant; the other party reprobate this view as "low," and maintain an *objective* "mystical presence" of the thing signified, along with the sign. Notwithstanding the "higher" doctrine of the Scotch confession, the tendency in Scotland seems to be more the other way; from the pulpit, the rite is oftener spoken of in its commemorative character, and the signs as means of working upon the mind and feelings subjectively than as the vehicle of any objective, mystically operating grace.

LORELEI. See LURLEI, *ante*.

LORENCEZ, CHARLES FERDINAND LATRILLE, Comte de, b. France, 1814; educated in the French military school of St. Cyr and attached to the army of Africa and the Crimea, he distinguished himself at the capture of the Malakoff and was made gen-

eral of brigade; was put in command of the French expeditionary corps in 1862 for the subjugation of Mexico, where he participated in several victories and defeats of the French armies. After the appointment of gen. Forey to the command of the French in Mexico he returned to France, and was a devoted adherent of Louis Napoleon.

LO'RENZ, OTTOKAR, b. Iglau, Moravia, 1832; educated in Vienna, and appointed professor of history in the university there in 1860. In 1857 he received a governmental appointment in the department of the secret archives, which he was compelled to relinquish in 1865 on account of some indiscreet disclosures.

LORE'TO, SISTERS OF, or "Friends of Mary at the Foot of the Cross," a Roman Catholic sisterhood founded in Kentucky by Charles Nerinckx, a priest (1761–1824). The order is devoted to the cause of education and the care of destitute orphans, and has many establishments in the western states.

LORETTE', a beautiful village 9 m. from Quebec, a place of much resort, on account of its waterfall. The works for the supply of Quebec with water are here, and flour and paper are manufactured to some extent. Pop. about 1200, a portion of whom are Huron Indians.

LORET'TO (properly, LORETO), a city of the province of Ancona, in the kingdom of Italy, although of some architectural pretentions, and containing 5,300 inhabitants, is chiefly noticeable as the site of the celebrated sanctuary of the blessed Virgin Mary, called the *Santa Casa*, or holy house. The Santa Casa is reported to be the house, or a portion of the house, in which the Virgin lived in Nazareth, which was the scene of the annunciation of the nativity, and of the residence of our Lord with his mother and Joseph; and which, after the Holy Land had been finally abandoned to the infidel on the failure of the crusades, is believed to have been miraculously translated, first, in 1291, to Fiume in Dalmatia, and thence, Dec. 10, 1294, to Recanati, whence it was finally transferred to its present site. Its name (Lat. *Domus Lauretana*) is derived from Laureta, the lady to whom the site belonged. It would be out of place in a work like this to enter into any polemical discussion of this legend. Although numberless pilgrims resort to the sanctuary, and although indulgences have been attached by Julius II., Sixtus V., and Innocent XII. to the pilgrimages, and to the prayers offered at the shrine, yet the truth of the legend is no part of Catholic belief, and Catholics hold themselves free to examine critically its truth, and to admit or to reject it according to the rules of historical evidence. The church of the Santa Casa stands near the center of the town, in a piazza which possesses other architectural attractions, the chief of which are the governor's palace, built from the designs of Bramante, and a fine bronze statue of pope Sixtus V. The great central door of the church is surmounted by a splendid bronze statue of the Madonna; and in the interior are three magnificent bronze doors filled with bas-reliefs, representing the principal events of scriptural and ecclesiastical history. The celebrated holy house stands within. It is a small brick house with one door and one window, originally of rude material and construction, but now, from the devotion of successive generations, a marvel of art and of costliness. It is entirely cased with white marble, exquisitely sculptured, after Bramante's designs, by Sansovino, Bandinelli, Giovanni Bolognese, and other eminent artists. The subjects of the bas-reliefs are all taken from the history of the Virgin Mary in relation to the mystery of the incarnation, as the annunciation, the visitation, the nativity, with the exception of three on the eastern side, which are mainly devoted to the legend of the holy house itself and of its translation. The rest of the interior of the church is rich with bas-reliefs, mosaics, frescos, paintings, and carvings in bronze. Of this material the finest work is the font, which is a masterpiece of art. The holy house having been at all times an object of devout veneration, its treasury of votive offerings is one of the richest in the western world. It suffered severely in the French occupation of 1796, but it has since received numerous and most costly accessions. The frescos of the treasury chapel are among the finest to be found outside of Rome.

LORICA'TA, a name applied by Merren and Fitzinger to the crocodiles and those other reptiles which are provided with plated armor, *loricata* instead of *squamata*, the emydosaurians of De Blainville. The term is usually applied to the crocodiles alone.

L'ORIENT, a seaport of France, department of Morbihan, situated at the confluence of the Scorff and Blavet, in lat. 47° 48′ n., and long. 3° 25′ west. Pop. '72, 24,088. It is a well-built town, but rather dull-looking. The harbor, dockyard, and arsenal are among the best and largest in France, and the place ranks as a fortress of the third class; but its commerce received a blow at the revolution in 1789 from which it has never recovered. L'Orient has a communal college, a school of navigation, and another of marine artillery. The inhabitants are engaged chiefly in ship-building and the allied occupations. The only important manufacture is that of hats.

L'Orient owes its origin to the French East India company, which built an establishment here in 1666, for the purpose of trading to the east (whence the name of the town).

LOR'IKEET, a species of parrot very numerous in Australia and the eastern archipelago, having the tongue covered with bristly hairs, with which they collect honey from

flowers. They are of very beautiful plumage, and being gregarious present a most beautiful spectacle, flying in flocks containing sometimes over a thousand birds. They belong to the genus *trichoglossus*.

LORIMER (Fr. *lormier*, from Lat. *lorum*, a thong), a maker of bits, spurs, stirrup-irons, metal mountings for saddles and bridles, and generally of all articles of horse-furniture. In London, the lorimers, who had previously formed part of another guild, were incorporated by letters patent in 1712; in the Scottish burghs they have been comprehended as a branch of the corporation of hammermen. Cutlers, locksmiths, and brass-founders have been considered as in the exercise of branches of the lorimer art, and therefore bound to enter with the corporation. The court of session in 1830 held it to be a violation of the exclusive privileges of the lorimer craft to manufacture bits, stirrup-irons, and other metallic articles of horse-furniture, with a view to silver-plating them before selling.

LORIMER, GEORGE CLAND, b. 1837; lost his father while very young, and, his mother marrying again, he was brought up by his stepfather, who was connected with the theatrical profession in Edinburgh. He attended school in that city, and acted as call-boy in the theater in the evening; but at length went to sea for a time. On his return to Edinburgh he resumed his stage connection; and, after a time, went to Newcastle and Dublin, and in the latter city acted as assistant stage-manager at the Queen's theater. He was of a studious disposition, and employed his leisure in reading and in cultivating a knowledge of the classics. In 1855 he removed to America, and played in Louisville, Ky., with success. It was at this time, and at the age of 18 years, that he became so impressed with religious convictions that he joined the Baptist church and left the stage permanently. He now entered upon a collegiate course at Georgetown, Ky., where he received the degree of A.M. Some years later he took the degree of D.D. at Bethel college. In 1859 he was ordained at Harrodsburg, Ky., and took charge of a church in Paducah in that state in 1860. Later, he was called to the Walnut street church in Louisville, the one with which he had first united. In 1868 he removed to Albany, N. Y., and in 1870–71 to Boston, Mass., where he occupied the pulpit of the Shawmut Avenue church, and drew crowded audiences. He took charge of the congregation of Tremont Temple shortly after, and remained in that church six years, at the same time acting as associate editor of the *Watchman*. In 1879 he took charge of the First Baptist church in Chicago.

LORING, CHARLES GREELEY, LL.D., 1794–1867; b. Boston; graduated at Harvard in 1812; studied law, and for many years was eminent as a practitioner in his native city. From 1857 to 1867 he was actuary of the hospital life and trust company. He was author of *Neutral Relations of the United States and England*, a *Life of William Sturgis*, and various public addresses. Died at Beverly.

LORING, FREDERICK W., 1846–71; b. at Newtonville, Mass.; graduated at Harvard in 1870, and soon won a high reputation as a writer by his contributions to leading magazines and papers, and especially by a novel, *Two College Friends*, which was thought to exhibit rare powers and to give promise of high distinction. In the capacity of literary correspondent he joined the party of lieut. Wheeler, which was sent to explore Arizona, and was murdered by the Indians in that territory Nov. 5, 1871.

LORING, GEORGE BAILEY, b. North Andover, Mass., 1817; graduated at Harvard college in 1838, and at the Harvard medical school in 1842, after which for several years he was physician at the Chelsea (Mass.) marine hospital. Since 1850 he has devoted himself extensively to the study of science in its applications to agriculture, and to the pursuits of public life. Residing in Salem, he has several times represented that city in both branches of the legislature, and served for several years as president of the senate. He was also for many years president of the Massachusetts agricultural society, and a member of the republican national convention in 1868 and 1872. He enjoys a high reputation as a public speaker, and has often been the chosen orator upon occasions of popular interest. Some of his orations have had a wide circulation. In the state senate he made an effective plea for scientific education in support of the plans of the late prof. Agassiz, and spoke eloquently in defense of Charles Sumner's action in regard to the "regimental colors" used in the civil war. He was a member of congress from the Essex district, 1877–81, and has been a large contributor to Flint's *Agricultural Reports* and Murray's work *On the Horse*.

LORING, WILLIAM W., b. N. C. about 1815; served as lieut. of mounted volunteers in the Florida war of 1835–42; became capt. of mounted rifles 1846, and maj. 1847; commanded a regiment in the war with Mexico; was brevetted lieut.col. for bravery at Contreras and Churubusco, and col. for his gallant services at Chapultepec; lost an arm in the capture of the city of Mexico; was commander of an expedition against the Indians of New Mexico in 1857; resigned his colonelcy and entered the confederate army in 1861, where he was first a brig. and afterwards a maj.gen., serving in West Virginia, at Vicksburg, Chattanooga, etc. After the rebellion ended he went to Egypt and became chief of staff of the khedive.

LORINSER, KARL IGNAZ, 1796–1853; b. Bohemia; educated at Prague and Berlin, and for a time instructor in veterinary surgery in medical colleges at Berlin and Stettin, and subsequently medical councilor in various places. He published *Encyclopädie der Thierheilkunde*, 1820; *Untersuchungen über den Rinderpest*, 1831; and *Zum Schutze der Gesundheit auf Schüler*, 1836. The latter work made a great sensation, and led to the revival of gymnastic exercises in the German schools.

LO'RIS, a genus of *lemuridæ*, differing from the true lemurs in having a round head and short muzzle, very large eyes, and no tail. The two species known are both natives of the East Indies. The largest species, *L. tardigradus*, is not so large as a cat; the other, *L. gracilis*, is much smaller. They are nocturnal animals, and spend the day generally sleeping attached to a branch, which they grasp firmly with all their four hands, the body rolled up into a ball, and the head hidden among the legs. Their fur is rich and soft. Their motions are slow, and they advance stealthily and noiselessly on the insects and birds on which they prey. They feed, however, partly on fruits and other vegetable food; in confinement they readily eat rice and milk, and are very fond of eggs.

LORRAINE', originally a portion of the German empire. Its history dates from 855, when Lotharius II. obtained (see CARLOVINGIANS) the lands between the Scheldt, Rhine, Meuse, and Saône, called the kingdom of Lotharius (*Lotharii regnum*), or Lotharingia, or Lorraine. The district now known as Rhenish Prussia was separated from Lorraine in the 10th c., and the remainder was divided in 1044 into two duchies, *Upper* and *Lower* Lorraine. The latter, after many vicissitudes, came into the possession of Austria, and now forms one-half of the kingdom of Belgium, and the provinces of Brabant and Gelderland, in Holland. Upper Lorraine continued to be governed by its own dukes till 1736, when it was given to Stanislas, ex-king of Poland, and on his death in 1766 was united to France. It was afterwards subdivided into the departments of the Meuse, Moselle, Meurthe, and Vosges. The inhabitants are of German origin, but speak the French language, with the exception of the district lying between Metz and the Vosges, which is called *German Lorraine*. This tract was ceded to Germany at the peace of 1871.

LORRAINE', CHARLES DE, Cardinal, 1525–74; b. France; became archbishop of Rheims when only 13 years of age, succeeding his uncle, Jean de Lorraine. Having officiated at the coronation of Henry II. in 1547, he was made cardinal. He was now employed on various diplomatic missions, which he conducted with success, gaining a high reputation for skill and astuteness in delicate negotiation. He was, however, suspected by the king, and but for the influence of Diana of Poictiers would have lost the royal favor. This at length happened on his quarreling with Diana, but having officiated at the coronation of Francis II. he became finance minister. In 1561 he officiated for the third time at a coronation, that of Charles IX., and in 1569 was sent to Spain to negotiate a marriage between that monarch and Elizabeth of Austria. He is said to have endeavored to introduce the inquisition into France, and to have favored the massacre of St. Bartholomew, though he was away from France at the time. He was warmly interested in letters, founded the university of Rheims, and was a brilliant orator and writer; but he was a bigot, ambitious, cruel, and vain.

LORRAINE, CLAUDE. See CLAUDE LORRAINE.

LORRAINE, CLAUDE (CLAUDE LORRAINE, *ante*). The name of Claude Lorraine glass is given to peculiarly tinted glass, sometimes used in opera-glasses and stereoscopes, which is supposed to give to the objects viewed the coloring characteristic of the artist's works. The term is used, however, by artists and opticians as the name of an appliance consisting of a plate of glass ground very slightly convex on the exterior and concave on the inner side and coated with a surface of black composition highly polished. This is so placed as to reflect a landscape, which may be then drawn from the reduced image in the glass, the convexity of surface assisting in the perspective and distance.

LORTZING, ALBERT GUSTAV, 1803–51; b. Prussia; went upon the stage when very young, retaining his connection with it as actor, singer, or composer till his death. He is best known as the composer of *Zar und Zimmermann; Undine;* and *Der Wildschütz*.

LORY, *Lorius* a genus of birds of the parrot family (*psittacidæ*), natives chiefly of the s.e. of Asia and the eastern archipelago. They have a dense soft plumage, exhibiting the most rich and mellow colors; the tail is rounded or graduated, generally not long; the bill is feebler than in many of the parrots, and the upper mandible much arched. They are very active and lively, even in confinement, and are also of very gentle and affectionate disposition. Red, scarlet, crimson, and yellow are the prevailing colors of their plumage; but the name lory is often extended to some Australian birds of the same family, in which much more of a green color appears, and which have a stronger bill and a much less gentle disposition. The true lories feed much on the softest and most juicy fruits; the Australian birds so called are very troublesome as robbers of the fields of ripening maize.

LOS ANGELES, a s. co. of California, 2,125 sq.m.; pop. '80, 33,379. The Pacific ocean bounds it on the s. and s.w.; its climate is semi-tropical; the productions are fruits, nuts, and grapes, live-stock, wool, grain, and olives. There is a large production of wine and brandy. In the n. region the surface is dry and sandy, but the valleys that intersect the coast range are many of them fertile. Watered by the Los Angeles river,

irrigation is practiced in some parts, and artesian wells are depended upon for drinking water. There are hot springs possessing medicinal properties. The Southern Pacific railroad, in progress, will make connection with San Francisco, to which point steamers run from Santa Monica. Co. seat, Los Angeles.

LOS ANGELES, a city in s. California, on the river of the same name, 30 m. from its mouth; pop. '80, 11,311; reached by the Southern Pacific railroad from San Francisco. It is connected with Santa Monica, on the coast, by a railroad 18 m. long: from this point there is also communication with San Francisco by steamer. Originally settled by the Spaniards in 1780, it was called by them *Pueblo de Los Angeles*, "town of the angels," from the extreme beauty of its situation and the charm of its climate. It was built of adobe; but the old structures have been destroyed in most instances, and replaced by larger and more imposing buildings. The Los Angeles valley is very fertile, and the city is the center of the orange-growing industry of California, while the plain below is covered with fine vineyards; lemons and olives also are largely cultivated. The climate of Los Angeles is mild and delightful, and it is greatly frequented by invalids, who prefer it even to San Diego, on account of its freedom from the coast winds. It is the market for the interior of that part of California, and does a thriving business. It contains public schools, a college (St. Vincent's), a library, and several newspapers, English, German, and Spanish.

LOS HERREROS. Se BRETON DE LOS HERREROS, *ante*.

LOSKIEL, GEORGE HENRY, 1740–1814; b. Courland, Russia; entered the ministry of the Moravian church, and wrote a history of the missions of that church among the Indians of North America from the accounts of the missionaries Gottlieb Spangenburg and David Zeisburger; was ordained a bishop at Hernhutt in 1802, and came at once to the United States as superintendent of the Moravian churches and pastor at Bethlehem, Penn., where he died.

LOSSING, BENSON JOHN, LL.D., 1813; b. New York. After serving an apprenticeship at the watch-making trade, he became editor, in 1835, of the *Poughkeepsie Telegraph*, and in 1836 of the *Poughkeepsie Casket*, a literary magazine, with illustrations by himself. In 1838 he began business in New York as a wood-engraver, during the next ten years editing and furnishing the illustrations for the *Family Magazine* and the *Young People's Mirror*. He had already begun the study of American history, to which he henceforward devoted himself. He traveled extensively in the United States, visiting and making sketches of places of historical interest, and contributing illustrated articles on historical subjects to various periodicals. Among his numerous works may be mentioned *Pictorial Field-Book of the Revolution*, 1852; *Pictorial History of the United States*, 1854; *Life of Washington*, 1860; *The Hudson*, 1866; *Pictorial History of the Civil War*, 1866–69; *Pictorial Field Book of the War of* 1812; *Our First Century*, 1876; *Story of the U. S. Navy for Boys*, 1880; and *Cyclopædia of U. S. History*, 1881. He is an admirably picturesque, instructive, and interesting historical writer, and his works have for years been very popular.

LOSSI'NI (Ger. *Lussin*), an island in the gulf of Quarnero, Adriatic sea, forming part of the Austrian Küstenland, lies immediately s.w. of Cherso (q.v.). Length, 21 m.; breadth, from 1 to 3 miles. The principal place on the island is Lossini Piccolo, or Little Lossini, with 7,100 inhabitants, a fine harbor, and an active trade.

LOSS OF SPEECH. See APHASIA, *ante*.

LOST PROPERTY. In point of law, the finder of lost property is entitled to keep it until the owner is found; but there are certain circumstances in which the keeping of it will be construed by a jury to amount to larceny. The rule which seems to be laid down in recent cases in England which have been fully discussed, is, that if the finder find the property in such circumstances that he either knows the owner, or has ready means of discovering him, then the taking of the property with intent to keep it will be larceny. If, for example, a servant find a sovereign in her master's house, and keep it, that would be larceny. So it was held to be larceny where the prompter on the stage of a theater picked up a £50 note which had been dropped by one of the actors. On the other hand, if there be no reasonable probability of ever discovering the true owner, then there is no larceny. The all important point of time for the jury to inquire into is, when the finder picked up the article; for if, on examination, he did not then know who the owner was, nor had the means of ascertaining, he will not become guilty merely because he afterwards, on hearing of the owner, nevertheless keeps it. It has also been decided that the mere keeping of a lost article, in hopes of getting a reward for giving it up, and though the owner be known, does not amount to larceny. There is also no obligation on the finder of lost property to incur expense in advertising for the owner; indeed, the owner would not be bound in England to repay such expense, though it might be different or doubtful in Scotland; and it is to be borne in mind that the real owner is not divested of his property by the loss, but can demand it from whosoever is in possession of it. But there are some peculiarities on this subject as regards lost bills of exchange and notes, which, though originally lost, yet, if transferred without notice, become the property of the transferee. Moreover, the loser of a bill or note payable to bearer cannot sue the party liable, at least without giving an indemnity.

There is an exception to the rule, that the finder of lost property is entitled to it, where the property consists of gold, silver, etc., hidden in the earth, in which case the treasure-trove belongs not to the finder, but to the crown; and the finder is bound to give notice thereof to the crown, under a penalty.

LOST TRIBES. See BABYLONISH CAPTIVITY.

LOT (ancient *Oltis*), a river of southern France, one of the largest tributaries of the Garonne, rises at Mt. Lozère, in the Cevennes. It flows in a generally western direction through the department of Lozère, Aveyron, Lot, and Lot-et-Garonne, joining the Garonne from the right at Aiguillon, after a course of 270 miles. It is navigable for about 170 miles.

LOT, a department in the s. of France, formed out of the province of Guienne, and comprising the arrondissements of Cahors, Gourdon, and Figeac, is watered by the Dordogne and the Lot, with its tributary, the Sellé. Area, 2,005 sq.m.; pop. '76, 276,512. A range of hills, broad, but not very high, and containing some iron, runs through the center of the department from e. to w., in the form of a semicircle. The valleys yield corn, hemp, tobacco, and fruits, and the hillsides are clothed with vines. Flax-mills are numerous. Capital, Cahors (q.v.).

LOT, properly that which falls to one as his portion, and then a die or anything used in determining events by chance. The custom of deciding doubtful questions by lot is of high antiquity and of great extent. Among the Hebrews, the land of Canaan was divided by lot among the tribes, and the cities distributed among the priests and Levites. The choice of men for an invading force, the apportionment of possessions, spoil or prisoners to captors or foreigners, the detection of a criminal as Achan, the selection of the scapegoat on the day of atonement, and the appointment of persons to office as in the choice of an apostle,—in all these cases the lot was used, but always with solemn reference to the interposition of God. We have no information as to the precise manner of casting lots; several modes may have been practiced. Among the ancients, with whom the use of the lot was very general, it was considered as a sort of appeal to the Almighty, free from all influence of passion or bias. Among the heathen, the choice of a champion in combat, the decision of fate in battle, the appointment of magistrates, priests, or other functionaries, the division of conquered or colonized land, was done by lot. There was a mode of divination with pagans by means of arrows, two inscribed and one without mark; and among the Germans the practice of deciding by marks on twigs, as mentioned by Tacitus. The Greeks and Romans were accustomed to divine events by marking various lots with a prophetic verse. Also, on opening the works of the poets, they considered the passage which they first saw as an oracle. The Bible has been used in the same way, the use of words or passages chosen at random from Scripture being received as a token of the divine will. *Sortes Biblicæ* prevailed among Jews and among Christians, though denounced by several councils. Election by lot prevailed in the Christian church as late as the 7th century.

LOT, a biblical character, son of Haran, the brother of Abraham, and the grandson of Terah. The events of his life will be found in Gen. xi.-xix. After the death of Terah, Abraham and Lot journeyed from Haran to Canaan, and thence into Egypt; and again returned to Bethel, where they accumulated great wealth, until, quarrels arising between their servants, separation was agreed upon. Lot crossed the Jordan and dwelt near the wicked city of Sodom, which afterwards was destroyed on account of its fearful depravity. Lot, warned of the Lord, fled to Zoar. From Zoar, Lot retreated to a cave in the mountains, and became the father of Moab and Ben-ammi, from whom descended the Moabites and Ammonites. This nephew of Abraham is set forth in Scripture as a man of low moral tone—falling into evil through self-seeking.

LOTBINI'ERE, a co. in e. Quebec, having the St. Lawrence river for its n. boundary; intersected in the e. portion by the Grand Trunk railway; 735 sq.m.; pop. '71, 20,606. It is drained by the river Du Chene and the Beaurirage river, emptying into the St. Lawrence. Its industries are represented by foundries, saw mills, grist mills, and carding and fulling mills. Seat of justice, Lotbiniere.

LOT-ET-GARONNE, a department in the s.w. of France, formed out of the province of Guienne, and comprising the arrondissements of Agen, Villeneuve, Marmande, and Nérac, is watered principally by the Garonne and the Lot. Area, 2,060 sq.m.; pop. '76, 316,920, among whom are a considerable number of French Protestants. The department is level, except in the s., where spurs of the Pyrenees make their appearance, and extremely fertile in the basins of the large rivers; but the e. is chiefly composed of barren wastes, and the s.w. of sandy and marshy tracts termed *landes*. The principal products are corn, wine, excellent hemp, fruits (of which the *prunes d'entes* of Agen are particularly celebrated), tobacco (considered the best manufactured in France), anise, and coriander. Pine, cork, and chestnut woods are numerous; domestic animals, especially poultry, are reared in great numbers for exportation. The chief metal is iron, and the department has 10 iron-works, besides various manufactures more or less important.

LOTHAIRE' I., King of Italy, 796–885; son of Louis le débonnaire, and suzerain over his two brothers, Pepin and Louis, with whom he shared the empire of the west. He was crowned king of Italy by the bishop of Milan in 822, having been already named

king of the Lombards two years before. Having dethroned his father, his two brothers opposed him and defeated him at Fontenay in 841. In 843 a treaty was made at Verdun, by which a satisfactory distribution of the empire was made, Lothaire receiving for his share Italy and some French provinces beyond the Rhine and the Rhone and the title of emperor. One of the French districts was afterwards called Lotharingia, after Lothaire, the son of the emperor, who was its first king. From this designation arose the name Lorraine.

LOTHAIRE II., THE SAXON, King of Germany, 1075–1137; succeeded Henry V., after having had alternate feuds and reconciliations with that monarch and his predecessor, Henry IV., during a period of 25 years. Having allied himself with pope Innocent II., he defeated the duke of Swabia in 1132, and Innocent crowned him emperor of Rome, June 4, 1133. He afterwards made an expedition for the purpose of driving Anacletus, the antipope, out of Italy, and was completely successful, but was seized with severe illness while on his return and died. The session of the diet of Madgeburg, 1135, occurred during his reign, when the first regulations of the German empire were formulated.

LOTHARINGIA. See LORRAINE, *ante*.

LOTHIANS. See SCOTLAND.

LOTHROP, SAMUEL KIRKLAND, D.D., b. Utica, N. Y., 1804; graduated at Harvard in 1825; ordained at Dover, N. H., in 1829, where he remained until 1834, when he became pastor of the Brattle Street church (Unitarian) in Boston. He wrote the *Life of Samuel Kirkland*, his grandfather, for Sparks's collection of biographies, and a *History of Brattle Street Church*. Many of his occasional sermons and addresses have been published.

LOTHROP, THOMAS, b. probably in England; was a citizen of Salem, Mass., in 1634, and a representative of that city in the "general court" in 1647, '53, and '64. He subsequently settled in Beverly, where he founded a church and was prominent in civil affairs, representing the town four years in the "general court." On the breaking out of king Philips's war he led a company of militia, called "the flower of Essex," to Deerfield, where they were surprised and nearly all killed by the Indians, Sept. 29, 1675. A marble monument was erected in 1838 at "Bloody Brook," where the massacre took place, in memory of capt. Lothrop and his companions.

LOTIONS, or WASHES, are remedies of a liquid, but not of an oily nature, which are applied to circumscribed portions of the surface of the body. Amongst the lotions most commonly employed are the *muriate of ammonia wash*, which consists of a solution of sal ammoniac in water or in vinegar with or without the addition of spirit; it is much used in contusions, where there is no wound of the skin, in chronic tumors, in enlarged joints, etc. *Chloride of soda wash*, consisting of solution of chlorinated soda diluted with from ten to twenty times its volume of water, useful as a gargle in ulceration of the mouth and throat, and as a wash for foul ulcers generally. The *chloride of lime wash*, consisting of one or two drams (or more) of chloride of lime in a pint of water, used for the same purposes as the preceding wash; and *black wash*, prepared by adding calomel to lime-water (generally a dram of the former to a pint of the latter), most extensively used in venereal sores, and of service in many forms of intractable ulcers.

LOTOPHAGI (Gr. lotus-eaters), a name applied by the ancients to a peaceful and hospitable people inhabiting a district of Cyrenaica, on the n. coast of Africa, and much depending for their subsistence on the fruit of the lotus-tree, from which they also made wine. According to Homer, they received Ulysses hospitably, when, in the course of his wanderings, he visited them along with his companions, on whom, however, the sweetness of the lotus-fruit exercised such an influence that they forgot all about their native country, and had no desire to return home. This feeling of happy languor has been expressed with marvelous felicity by Tennyson in his poem on the lotus-eaters.

LOTTERY, a game of hazard, in which prizes are drawn by lot. Usually, a lottery comprises a specified quantity of tickets, each numbered, every ticket-holder having a right to draw from a box a prize or blank, as the case may happen to be, and thus gain or lose. Lotteries are, of course, got up for the sake of the profit which they may yield to their proprietors; for the aggregate sum expended in prizes always falls short of the aggregate purchase-money for tickets. Whatever be the actual form of the lottery, it is indisputably a gambling transaction, the risks and losses of which are now acknowledged to be demoralizing. Lotteries are said to have been first employed by the Genoese government as a means of adding to the revenue of the country, and the bad example was soon followed by the governments of other nations. The first lottery in England appears to have been in the year 1569, and the profits went to the repair of harbors and other public works. The same means was frequently afterwards resorted to for additions to the revenue, or for particular objects, under control or by sanction of the government, the mode of conducting the lottery, and the conditions, being from time to time varied. In the early years of the present century, the state lottery, as it was usually called, was one of the regular institutions of the country. Usually, the number of tickets in a lottery was 20,000, at a value of £10 each in prizes. At this valuation they were offered to the competition of contractors, and ordinarily assigned at an advance of

£5 or £6 per ticket. The contracting party sold them to the public at a further advance of £4 to £5 per ticket; and thus the value was about doubled. The contractor devised the scheme of prizes and blanks—there being always a few prizes of large amount to tempt purchasers. To accommodate persons with moderate means, certain tickets were divided into halves, and others into quarters, eighths, or sixteenths. A common price for a sixteenth was £1 11s. 6d. In the event of the number which it bore being drawn, a prize of £20,000, a sixteenth part of that sum was paid, and so on with other prizes. The dexterity of the contractors consisted in drawing up "schemes," which in all varieties of placards and hand-bills were issued in profusion through the means of agents all over the country. The drawing took place on a specified day or days in a public hall in London, before certain commissioners, and was in this wise. Two machines, called "wheels," were appropriated, one for the numbers, and the other for the prizes and blanks. On a number being drawn, its fate was determined by the billet which next afterwards came out. Two boys were the operators, one at each wheel. On the grounds of injury to public morals, lotteries were altogether abolished by act of parliament in 1826. Persons advertising or circulating tickets for foreign lotteries may be sued for a penalty by the attorney-general, or lord-advocate, or the commissioners of stamps. It required a special statute, therefore, to legalize art-unions, which are only lotteries under a specious form; but owing to their supposed good effects in encouraging art, they were exempted from penalties by the statute 9 and 10 Vict. c. 48, and a similar voluntary association was excepted by the statute 21 and 22 Vict. c. 102. In France, the abolition of lotteries took place in 1836, and in Hesse-Darmstadt in 1852. The other German states, however, continued the use of them; and in 1841, Prussia derived from them a revenue of more than 900,000 thalers. Austria, of 3,600,000 florins. In the kingdom of Italy lotteries still exist. Few worse ways of supplying the exchequer of a country have almost ever been imagined; and the only excuse urged is, that the gambling spirit exists, and will find some means of gratification, even if lotteries were abolished. It was found, however, in France that the abolition of lotteries was immediately followed by an increase of savings-bank deposits; and it has been everywhere observed that the purchasers of lottery-tickets have been to a great extent persons belonging, not to the wealthiest classes of society, but to those in which economy and prudence are most necessary to the comfort of families and the general welfare of the state.

LOTTERY (*ante*). In this country lotteries were generally tolerated, though not without earnest remonstrances from some quarters, until about 1830, when the opposition to them assumed a tangible form, and not long afterwards they were forbidden by law in several states, and opposed by a strong public sentiment in others. Before this time they were chartered for a great variety of objects, such as the erection of colleges, academies, asylums, hospitals, and even houses of worship. As a convenient way of raising money for public and charitable objects, they were for a long time tolerated by men of influence, who were not wholly blind to their demoralizing tendency. As early as 1699 an assembly of ministers in Boston denounced them as a "cheat," and their agents as "pillagers of the people;" but such testimonies, being generally regarded as too straitlaced and puritanic, exerted but a feeble influence. For a whole century and more afterwards, lotteries were in fair repute as a means of raising money for public and charitable objects. Indeed, it was not until after 1830 that any organized movement for their suppression was made. In Boston, in 1832, an association of young men connected with Dr. Lyman Beecher's church, after a careful investigation of the subject in all its bearings, condemned them and called for their extermination on grounds of morality and public policy. This action was extensively approved by the press, and did much to create a sound public opinion in New England. In 1833 Job R. Tyson of Philadelphia published *A Brief Survey of the Great Extent and Evil Tendencies of the Lottery System of the United States*, and in the same year a society was formed in Pennsylvania to promote the abolition of the system, which was accomplished within a year or two in Pennsylvania, Massachusetts, and Connecticut. Maryland followed in 1836, and from this time the progress of the reform was rapid. At the present time it may be said that lotteries are under legislative ban in every state of the union, though in a few states the laws on this subject, being partly prospective in their application, have not yet been carried into full effect. In most, if not all the states, the sale of tickets for foreign lotteries is prohibited, and to advertise them is a penal offense. A few years ago the so-called "art unions" were permitted to dispose of pictures and statuary by lottery; but this is now generally forbidden.

LOTUS. The name *lotos* (Lat. *lotus*) was given by the Greeks to a number of different plants whose fruit was used for food. One of the most notable of these is the *zizyphus lotus*, a native of the n. of Africa and the s. of Europe, belonging to the natural order *rhamneæ*. See JUJUBE. It is a shrub of two or three feet high, and its fruit, which is produced in great abundance, is a drupe of the size of a wild plum, with an almost globose kernel. This fruit is somewhat farinaceous, and has a pleasant, sweetish, mucilaginous taste. It is called by the Arabs *nabk* or *nabka;* and has, from the earliest times, served as an article of food to the inhabitants of the n. of Africa, where it is still a principal part of the food of the poor. Probably it was on this fruit that Homer's *lotophagi* (q.v.) lived.—The fruit of the *diospyrus lotus*, or date plum, was sometimes

called the lotus. See DATE PLUM.—The name lotus was also given to several beautiful species of water-lily (q.v.), especially to the BLUE WATER-LILY (*nymphæa cærulea*) and the EGYPTIAN WATER-LILY (*N. lotus*), and to the nelumbo (q.v.) (*nelumbium speciosum*), which grow in stagnant and slowly running water in the s. of Asia and n. of Africa. The *nymphæa lotus* was called by the Egyptians *shnin* or *seshin*, and is called by the Arabs *beshnin*, the Coptic name with the masculine article. It grows in the Nile and adjacent rivulets, and has a large white flower. The root is eaten by the people who live near the lake Menzaleh. The rivulets near Damietta abound with this flower, which rises two feet above the water. It was the rose of ancient Egypt, the favorite flower of the country, and is often seen made into wreaths or garlands, placed on the foreheads of females, or held in their hands, and smelled for its fragrance. It frequently appears in the hieroglyphs, where it represents the upper country or southern Egypt, and entered largely into works of art—the capitals of columns, prows of boats, heads of staves, and other objects being fashioned in its shape. In the mythology, it was the special emblem of *Nefer Atum*, the son of Ptah and Bast; the god Harpocrates is seated upon it; and there was a mystical lotus of the sun. In the mythology of the Hindus and Chinese the lotus plays a distinguished part. It is the nelumbo. The Hindu deities of the different sects are often represented seated on a throne of its shape, or on the expanded flower. The color in southern India is white or red, the last color fabled to be derived from the blood of Siva, when Kamadeva, or Cupid, wounded him with the love-arrow. Lakshmî, also, was called the "lotus-born," from having ascended from the ocean on its flower. It symbolized the world; the *meru*, or residence of the gods; and female beauty. Among the Chinese, the lotus had a similar reputation and poetic meaning, being especially connected with Fuh, or Buddha, and symbolizing female beauty, the small feet of their women being called *kin leën*, or "golden lilies."

Wilkinson, *Mann. and Cust.*, iii. 187, 200, iv. 44, 63, v. 264, 269; Jomard, *Descr. de l'Eg.*, t. 1, s. 5; Homer, *Il.* xii. 238, iv. 171, *Od.* ix. 92; *Herodotus*, ii. 96, iv. 177; *Died. Sic.* i. 34; Coleman, *Mythology of the Hindus.*

LOTZE, RUDOLF HERMANN, b. Saxony, 1817; educated at the gymnasium of Zittau and the university of Leipsic, graduating in 1838 in medicine and philosophy, and in the following year filling the chair of philosophy at Leipsic as an adjunct professor. In 1842 he was made extraordinary professor at the university of Leipsic, and two years later ordinary professor at Göttingen. He has written voluminously on metaphysics, leaning toward the doctrines of Leipnitz and Herbart. Among the more important of his works are *Metaphysik* (Leipsic, 1841); *Logik* (1843); *Mikrokosmus* (3 vols., 1856–64); and *Geschichte der Aesthetik in Deutschland* (Munich, 1868, *et seq.*) His rank among living metaphysicians is high, though the estimates of him differ among different schools of thinkers.

LOUDON, a co. of e. Tennessee, traversed by the Tennesee river, and intersected by the East Tennessee, Virginia and Georgia railroad; 300 sq.m.; pop. '80, 9,148. It extends through a beautiful and fertile valley, and produces largely of grain and live stock. Co. seat, Loudon.

LOUDON, or LOUDOUN, co. in n.e. Virginia, bounded on the n.e. by the Potomac river, which separates it from Maryland; intersected by the Washington and Ohio railroad; 460 sq.m.; pop. '80, 23,634. The Blue ridge is on the n.w. border of this county, and the Kittoctan mountain is in the center. Its productions are wheat, Indian corn, oats, potatoes, wool, butter, and hay. It has a number of manufactories and mills. Co. seat, Leesburg.

LOUDON, GIDEON ERNEST, See LAUDOHN.

LOUDON, JOHN CLAUDIUS, a distinguished botanist and horticulturist; b. April 8, 1783, at Cambuslang, in Lanarkshire. He became a gardener, and in 1803 published *Observations on Laying out Public Squares*, and in 1805 a *Treatise on Hot-houses;* and afterwards became the author of a number of works on botany, mostly of a somewhat popular character, which have contributed much to extend a knowledge of that science and a taste for horticulture. Among these are the *Encyclopædia of Gardening* (1822); and *of Agriculture* (1825); the *Green-house Companion* (1825); the *Encyclopædia of Plants* (1829); and the *Arboretum et Fruticetum Britannicum* (8 vols. 1838), containing a very full account of the trees and shrubs, indigenous or introduced, growing in the open air in Britain. This last is his great work; but the expense attending the publication, owing chiefly to the number of plates, involved him in pecuniary difficulties. He died at Bayswater, Dec. 14, 1843. Loudon established four different magazines, which he edited simultaneously with his *Arboretum.*—His widow is the author of a number of pleasing popular works, chiefly on subjects connected with botany and gardening.

LOUGH'BOROUGH, a manufacturing and market-t. of England, in the co. of Leicester, 12 m. n.n.w. of the town of that name. The chief educational institution in the town is the Burton foundation (dating from 1495), with an annual income from endowment of £1742 16*s*. With this Foundation five distinct schools are connected, each pupil having to pay a small sum. Loughborough carries on extensive manufactures of patent Angola hosiery, of other woolen and cotton goods, elastic webs, net-lace, and shoes. Pop. '71, 11,588.

LOUGHREA', a market t. of Ireland, in the co. of Galway, about 20 m. e.s.e. of the town of that name. It stands on the n. bank of Lough Rea, a beautiful little lake 4 m. in circumference. It contains a Roman Catholic chapel, with a Carmelite friary and nunnery, and the remains of a Carmelite abbey founded in 1300. Manufactures of narrow linen and coarse diapers; brewing and tanning are carried on. Pop. '71, 3,072.

LOUIS OF BADEN (LOUIS WILLIAM I.), Margrave of Baden-Baden, 1655–1707; b. Paris; was a soldier under Montecuculi against the French, and fought the Turks in 1683 with great valor. In 1693 he recaptured Heidelberg, then in the hands of the French, being then in supreme command of the imperial army. He also fought with success in Alsace. He attempted to succeed John Sobieski as king of Poland, but was unable to accomplish his purpose. He was esteemed a general of rare ability, and not less an engineer of talent. In the latter capacity he designed certain important military works on the Rhine.

LOUIS I., King of Bavaria. See LUDWIG I., KARL AUGUST, *ante*.

LOUIS IV., THE BAVARIAN, Emperor of Germany, 1285–1347; b. Germany; son of Louis the severe, duke of Bavaria; pursued his early studies under the direction of his mother, Matilda, daughter of the emperor Rudolph I. of Hapsburg. His father being dead, he became co-heir with his brother Rudolph, and co-regent of the realm. In 1314 he was elected the successor of Henry VII. of Luxembourg, who had died in Italy the previous year, the majority voting for him, but a large minority declaring at Cologne in favor of his cousin, Frederick the fair, called Frederick le bel, of Austria (son of the emperor Albert I. and grandson of Rudolph of Hapsburg), proclaiming him emperor Frederick III. Louis was victorious in the battle of Mühldorf, Sept. 28, 1322, bringing to a close a long and ruinous war, which had laid waste a large part of Germany, and taking Frederick prisoner compelled him to renounce all claim to the succession. In 1323, having by his support of the Viscontis in Milan caused the estrangement of pope John XXII., he was excommunicated Mar. 21, 1324, and commanded by the pope to appear before him; but he appealed to a general council, and the summons was declared null and void by the diet of Ratisbon. In 1324 he married Margaret of Holland. In 1325 a treaty was formed by which Frederick was released from imprisonment on condition that he would return and deliver himself again to Louis if he found himself unable to induce his adherents to transfer their allegiance. The contrary being the result, the vanquished returned into captivity in conformity with his oath, and was appointed governor of his own Bavarian possessions. In 1327 Louis defied the pope of Rome, accusing him of heresy, and was crowned king in Milan, receiving at Rome in 1328 the sacred sanction of the bishops of Venice and Aleria. Through his influence pope John was deposed, and Peter de Corbiére, called Nicholas V., was established antipope. This movement resulting in general unpopularity, he returned to Germany to defend his possessions there, which were continually threatened by John XXII. and his successors, Benedict XII. and Clement VI., with their foreign allies, assisted by French intrigues. He added to his strength in Germany the dominions of Holland, Zealand, Friesland, etc., which had come to him with his wife, Margaret of Holland. He was suddenly killed by a fall from his horse while hunting at Fürstenfeld, near Munich.

LOUIS I. See CARLOVINGIANS.

LOUIS I., LE DÉBONNAIRE OR THE PIOUS (*ante*), Roman emperor, king of the Franks, 778–840; b. at Casseneuil; son of Charlemagne by his third wife, Hildegarde. His elder brother having died he succeeded his father in 814. He was quite successful for a time, but in 817 he was persuaded to give his three sons, Lothaire, Pepin, and Louis, a share in his dominions, and from this arose complications that finally led to a dissolution of the empire. Bernard, a nephew of Louis, who had inherited Italy after his father, receiving nothing under the new arrangement, revolted; but the emperor allured him to Chalons, made him a prisoner, put out his eyes, and gave Italy to his son Lothaire. In his remorse for this crime the emperor sought consolation in the church, and thenceforth was a mere tool in the hands of the priests. In 819 he married a second wife, Judith of Bavaria, who in 823 bore him a son, known in history as "Charles the bald." In 829, in the interest of this son, he proposed a new division of the empire; but to this the elder sons objected, and the result was a war which lasted during the remainder of the emperor's life. Twice the father was defeated, taken prisoner, and deposed by his sons; but Lothaire, by his ambition to turn everything to his own account, incurred the hostility of his brothers, who conspired to raise the father again to the throne. On the death of Pepin in 838 Louis I. proposed to exclude his elder sons, Lothaire and Louis, from their inheritance, and to give his dominions to Charles the bald. Against this arrangement Louis revolted, and was joined by the sons of Pepin. In the midst of the war the emperor died at Ingelheim and was buried at Metz.

LOUIS II., LE BÈGUE, King of France (see CARLOVINGIANS, *ante*), b. in 846; a son of Charles the bald; reigned 877–79.

LOUIS III., King of France (see CARLOVINGIANS, *ante*), b. 863; eldest son of Louis II. The kingdom being divided in 879 between his brother Carloman and himself, he had allotted for his share that portion called Neustria. The Normans having invaded

France, he successfully resisted them and gained a battle. At his death, at about the age of 20 years, Carloman reigned alone over France.

LOUIS IV., D' OUTREMER, King of France (see CARLOVINGIANS, *ante*); reigned 927–54; a son of Charles the simple; was educated in England at the court of king Athelstane, his mother's brother. On the death of Raoul of Burgundy in 936 he was called to the French throne by Hugh of Paris and William of Normandy, by whose intrigues his reign was constantly disturbed.

LOUIS V., LE FAINÉANT, King of France (see CARLOVINGIANS, *ante*), b. 966; son of Lothaire and Emma; reigned 986–87; the last king of the Carlovingian dynasty.

LOUIS VI., THE FAT; VII.; VIII., THE LION; IX., SAINT LOUIS (LOUIS IX., *ante*), Kings of France. See CAPETIAN DYNASTY, *ante*.

LOUIS IX., or SAINT LOUIS, King of France, b. in Poissy, April 25, 1215, succeeded his father, Louis VIII., in 1226. His mother, Blanche of Castile, a woman of great talent and sincere piety, was regent during his minority, and bestowed on him a strictly religious education, which materially influenced his character and policy. When Louis attained his majority he became involved in a war with Henry III. of England, and defeated the English at Taillebourg, at Saintes, and at Blaye in 1242. During a dangerous illness he made a vow that if he recovered he would go in person as a crusader, and, accordingly, having appointed his mother regent, he sailed in Aug., 1248, with 40,000 men to Cyprus, whence, in the following spring, he proceeded to Egypt, thinking, by the conquest of that country, to open the way to Palestine. He took Damietta, but was afterwards defeated and taken prisoner by the Mohammedans. A ransom of 100,000 marks of silver procured his release on May 7, 1250, with the relics (6,000 men) of his army. He proceeded by sea to Acre, and remained in Palestine till the death of his mother (Nov., 1252) compelled him to return to France. He now applied himself earnestly to the affairs of his kingdom, united certain provinces to the crown on the lapse of feudal rights or by treaty, and made many important changes, the general tendency of which was to increase the royal power. A code of laws was brought into use, known as the *Etablissements de St. Louis*. Louis embarked on a new crusade July 1, 1270, and proceeded to Tunis; but a pestilence breaking out in the French camp, carried off the greater part of the army and the king himself. He died Aug. 25, 1270; and his son, Philip III., was glad to make peace and return to France. Pope Boniface VIII. canonized him in 1297. For an interesting picture of the religious side of Louis's character, consult Neander's *Kirchengeschichte*. Bohn, vol. vii., pp. 416–18.

LOUIS XI., King of France, the eldest son of Charles VII., b. at Bourges, July 3, 1423, was from his boyhood eminently cruel, tyrannical, and perfidious. He made unsuccessful attempts against his father's throne, was compelled to flee to Brabant, and sought the protection of Philip the good, duke of Burgundy, with whom he remained till his father's death in 1461, when he succeeded to the crown. The severe measures which he immediately adopted against the great vassals led to a coalition against him, at the head of which were the great houses of Burgundy and Bretagne. Louis owed his success more to his artful policy than to arms; and the war threatening to break out anew, he invited Charles the bold, duke of Burgundy, to a friendly conference at Péronne, in Oct., 1468. His agents, meanwhile, had stirred up the people of Liege to revolt against the duke, upon the news of which occurrence Charles made the king a prisoner, and treated him roughly. On the death of the duke of Burgundy in 1477, who left an only daughter, Louis claimed great part of his territories as male fiefs lapsed to the superior, and wished to marry the young duchess to his eldest son, a boy of seven years. On her marriage with the archduke Maximilian, he flew to arms; but a peace was concluded at Arras, Dec. 25, 1482, by which the daughter of Maximilian was betrothed to the dauphin (afterwards Charles VIII.), and the counties of Burgundy and Artois were handed over to France. Louis was also successful—after the use of means far from honorable—in annexing Provence to the crown as a lapsed fief. He greatly increased the power of the French monarchy. The latter years of his reign were spent in great misery, in excessive horror of death, which superstitious and ascetic practices failed to allay. He died Aug. 30, 1483. It was calculated that he put about 4,000 persons to death in the course of his reign, mostly without form of trial. Yet he was a patron of learning, and is said to have been the author of *Les cent Nouvelles nouvelles*, a sort of imitation of the *Decameron*, and of the *Rosier des Guerres*, a book of instruction for his son. He also materially advanced the civilization of France by encouraging manufactures, commerce, and mining. He improved the public roads and canals, established several printing-presses, and founded three universities.

LOUIS XII., b. 1462, King of France, succeeding Charles VIII.; son of duke Charles of Orleans, and a descendant of Valentina Visconti. He reigned 1498–1515. In 1500, by virtue of his descent, he laid claim to Milan, conquered it, and took Ludovico Sforza prisoner. By the aid of Ferdinand of Aragon he conquered Naples too, but the allies quarreled over the partition of their conquest, and in 1503 Gonsalvo de Cordova expelled the French from southern Italy. In 1508 pope Julius II. formed the league of Cambray against the republic of Venice, being joined by Ferdinand of Aragon, Louis XII., and the emperor of Germany; but Venice having conciliated the pope by concessions, the

league was dissolved, and a new one, called the "holy league," was formed between the pope, the emperor, Venice, Ferdinand of Aragon, and Henry VIII. of England against France, and in 1513 the French were expelled from Italy.

LOUIS XIII., King of France, son of Henri IV. and Marie de' Medici, b. at Fontainebleau, Sept. 27, 1601, succeeded to the throne on the death of his father, May 14, 1610, his mother becoming regent. She entered into close alliance with Spain, and betrothed the king to Anne of Austria, daughter of Philip III. of Spain, upon which the Huguenots, becoming apprehensive of danger, took up arms; but peace was concluded at St. Menehould on May 5, 1614; and the king, who was now declared of age, confirmed the edict of Nantes, and called an assembly of the states, which was soon dismissed because it began to look too closely into financial affairs. See MARIE DE' MEDICI. The suppression of Protestantism and liberty in Bearn led to the religious war in which the Protestants lost almost all their places of security, and which ended in 1622. After the death of De Luynes, in 1624, Richelieu, afterwards cardinal and duke, became the chief minister of Louis. His powerful mind obtained complete control over that of the weak king, and his policy effected that increase of monarchical power, at the expense of Protestants, nobles, and parliaments, which reached its consummation in the reign of Louis XIV. The overthrow of the Huguenots was completed by the capture of Rochelle, Oct. 20, 1628, at the siege of which the king took part in person. In 1631 his brother, the duke of Orleans, having left the court, assembled a troop of Spaniards in the Netherlands, and entered France to compel the dismissal of Richelieu, whom he hated, and whom the king also secretly disliked; but the duke was completely defeated by marshal Schomberg at Castelnaudary. Richelieu now led Louis to take part in the thirty years' war, openly supporting Gustavus Adolphus and the Dutch against the Spaniards and Austrians. The latter years of Louis' reign were signalized by the getting possession of Alsace and of Roussillon, acquisitions which were confirmed in the following reign. Louis died May 14, 1643. His queen, after 23 years of married life, bore a son in 1638, who succeeded to the throne as Louis XIV.; and in 1640, a second son, Philip, duke of Orleans, the ancestor of the present house of Orleans.

LOUIS XIV., King of France, b. at St. Germain-en-Laye, Sept. 16, 1638, succeeded his father, Louis XIII., in 1643. His mother, Anne of Austria, became regent, and Mazarin (q.v.) her minister. During the king's minority, the discontented nobles, encouraged by Spain, sought to shake off the authority of the crown, and the civil wars of the *Fronde* (q.v.) arose. Peace was concluded in 1659; and in the following year Louis married the Infanta Maria Theresa, a princess possessing neither beauty nor other attractive qualities. Little was expected from the young king; his education had been neglected, and his conduct was dissolute; but on Mazarin's death, in 1661, he suddenly assumed the reins of government, and from that time forth carried into effect with rare energy a political theory of pure despotism. His famous saying, "*L'état c'est moi*" (I am the state), expressed the principle to which everything was accommodated. He had a cool and clear head, with much dignity and amenity of manners, great activity, and indomitable perseverance. The distress caused by the religious wars had created throughout France a longing for repose, which was favorable to his assumption of absolute power. He was ably supported by his ministers. Manufactures began to flourish under the royal protection. The fine cloths of Louviers, Abbeville, and Sedan, the tapestries of the Gobelins, the carpets of La Savonnerie, and the silks of Tours and Lyons acquired a wide celebrity. The wonderful talents of Colbert (q.v.) restored prosperity to the ruined finances of the country, and provided the means for war; whilst Louvois (q.v.) applied these means in raising and sending to the field armies more thoroughly equipped and disciplined than any other of that age.

On the death of Philip IV. of Spain, Louis, as his son-in-law, set up a claim to part of the Spanish Netherlands; and in 1667, accompanied by Turenne (q.v.), he crossed the frontier with a powerful army, took many places, and made himself master of that part of Flanders since known as French Flanders, and of the whole of Franche Comté. The *triple alliance*—between England, the States-general, and Sweden—arrested his career of conquest. The treaty of Aix-la-Chapelle (1668) forced him to surrender Franche Comté. He vowed revenge against the States-general, strengthened himself by German alliances, and purchased with money the friendship of Charles II. of England. He seized Lorraine in 1670; and in May, 1672, again entered the Netherlands with Condé and Turenne, conquered half the country in six weeks, and left the duke of Luxembourg to lay it waste. The States-general formed an alliance with Spain and with the emperor, but Louis made himself master of ten cities of the empire in Alsace; and in the spring of 1674 took the field with three great armies, of which he commanded one in person, Condé another, and Turenne a third. Victory attended his arms; and notwithstanding the death of Turenne, and the retirement of the prince of Condé from active service, he continued in subsequent years, along with his brother, the duke of Orleans, to extend his conquests in the Netherlands, where, by his orders, and according to the ruthless policy of Louvois, the country was fearfully desolated. The peace of Nimeguen, in 1678, left him possession of many of his conquests. He now established *chambres de réunion* in Metz, Breisach, and Besançon, pretended courts of law, in which his own will was supreme, and which confiscated to

him, as feudal superior in right of his conquests, territories which he wished to acquire, seignories belonging to the elector Palatine, the elector of Treves, and others. He also, on Sept. 30, 1681, made a sudden and successful attack on Strasburg, a free German city, the possession and fortification of which added greatly to his power on the Rhine. The acquisition thus made, a treaty in 1684 confirmed to him.

Louis had now reached the zenith of his career. All Europe feared him; his own nation had been brought by tyranny, skillful management, and military glory, to regard him with Asiatic humility, admiring and obeying; all remnants of political independence had been swept away; no assemblies of the states or of the notables were held; the nobles had lost both the desire and the ability to assert political power; the municipal corporations no longer exercised any right of election, but received appointments of officials from the court; the provinces were governed by *intendants*, who were immediately responsible to the ministers, and they to the king, who was his own prime minister. Even the courts of justice yielded to the absolute sway of the monarch, who interfered at pleasure with the ordinary course of law, by the appointment of commissions, or withdrew offenders from the jurisdiction of the courts by *lettres de cachet* (q.v.), of which he issued about 9,000 in the course of his reign. He asserted a right to dispose at his pleasure of all properties within the boundaries of his realm, and took credit to himself for gracious moderation in exercising it sparingly. The court was the very heart of the political and national life of France, and there the utmost splendor was maintained; and a system of etiquette was established, which was a sort of perpetual worship of the king.

It was a serious thing for France and the world when Louis fell under the control of his mistress, the marquise de Maintenon (q.v.), whom he married in a half-private manner in 1685, and who was herself governed by the Jesuits. One of the first effects of this change was the adoption of severe measures against the Protestants. When it was reported to Louis that his troops had converted all the heretics, he revoked the edict of Nantes in 1685, and then ensued a bloody persecution; whilst more than half a million of the best and most industrious of the inhabitants of France fled, carrying their skill and industry to other lands. Yet Louis was by no means willing to yield too much power to the pope; and quarreling with him concerning the revenues of vacant bishoprics, he convened a council of French clergy, which declared the papal power to extend only to matters of faith, and even in these to be dependent upon the decrees of councils.

The elector of the Palatinate having died in May, 1685, and left his sister, the duchess of Orleans, heiress of his movable property, Louis claimed for her also all the allodial lands; and from this and other causes arose a new European war. A French army invaded the Palatinate, Baden, Würtemberg, and Treves in 1688. In 1689 the lower Palatinate and neighboring regions were laid waste by fire and sword. This atrocious proceeding led to a new coalition against France. Success for a time attended the French arms, particularly in Savoy and at the battle of Steinkerk. Reverses, however, ensued: the war was waged for years on a great scale, and with various success: and after the French, under Luxembourg, had gained, in 1693, the battle of Neerwinden, it was found that the means of waging war were very much exhausted, and Louis concluded the peace of Ryswick, Sept. 20, 1697. The navy destroyed, the finances grievously embarrassed, the people suffering from want of food, and discontentment deep and general, Louis placed the count D'Argenson at the head of the police, and established an unparalleled system of espionage for the maintenance of his own despotism. The power of Mme. de Maintenon and her clerical advisers became more and more absolute at the court, where scandals of every kind increased.

When the death of Charles II. of Spain took place, Nov. 1, 1700, it was found that Louis had obtained his signature to a will by which he left all his dominions to one of the grandsons of his sister, who had been Louis's queen. Louis supported to the utmost the claim of his grandson (Philip V.), whilst the emperor Leopold supported that of his son, afterwards the emperor Charles VI. But the power of France was now weakened, and the war had to be maintained both on the side of the Netherlands and of Italy. One bloody defeat followed another; Marlborough was victorious in the Low Countries, and prince Eugene in Italy; whilst the forces of Louis were divided and weakened by the employment of large bodies of troops against the Camisards in the Cevennes, for the extinction of the last relics of Protestantism. On April 11, 1713, peace was concluded at Utrecht, the French prince obtaining the Spanish throne, but France sacrificing valuable colonies. A terrible fermentation now prevailed in France, and the country was almost completely ruined; but the monarch maintained to the last an unbending despotism. He died, after a short illness, Sept. 1, 1715. He was succeeded by his great grandson, Louis XV. His son, the dauphin, and his eldest grandson, the duke of Bretagne, had both died in 1711. Louis had a number of natural children, and he had legitimized those of whom Mme. de Montespan was the mother; but the parliament, which made no objection to recording the edict when required by him, made as little objection to annulling it when required by the next government. The "works" of Louis XIV. (6 vols. Paris, 1806), containing his instructions for his sons, and many letters, afford important information as to his character and the history of his reign. The reign of Louis XIV. is regarded as the Augustan age of French literature and art.

and it can hardly be doubted that France has never since produced poets like Corneille and Racine in tragedy, or Molière in comedy; satirists like Boileau, or divines like Bossuet, Fenelon, Bourdaloue, and Massillon.

LOUIS XV., King of France, the great-grandson of Louis XIV., b. at Versailles, Feb. 15, 1710, succeeded to the throne Sept. 1, 1715. The duke of Orleans, as first prince of the blood, was regent during the minority of the king, whose education was intrusted to marshal Villeroi and cardinal Fleury. The country was brought to the verge of ruin during the regency, by the folly of the regent and the financial schemes of the celebrated Scotchman, Law (q.v.). When Louis was 15 years of age he married Maria Lesczynski, daughter of Stanislas, the dethroned king of Poland. Fleury was for a long time at the head of affairs, and by parsimony succeeded in improving the condition of the finances. It was his policy also to avoid war, in which, however, Louis was involved in 1733, in support of his father-in-law's claim to the throne of Poland; the result being that Louis obtained Lorraine for his father-in-law, and ultimately for France. Notwithstanding the vigor with which this war was conducted, the character of Louis now became completely developed as one of the utmost sensuality, selfishness, and baseness. He surrounded himself with the vilest society, utterly forsook his queen, and lived, as he continued to do to the end of his life, in extreme debauchery, such as has rendered his name a proverb. In 1740 the war of the Austrian succession broke out, in which the French army was by no means very successful, and during which Fleury died. The king was present, in 1745, at the great victory of Fontenoy, and showed plenty of courage. In the preceding year, during a dangerous illness, he had made vows of reforming his life, and dismissed his mistresses: but on recovering health, he presently relapsed into vice. The peace of Aix-la-Chapelle, in 1748, was very much due to the entreaties of Mme. de Pompadour, whose influence the empress Elizabeth of Russia secured by bribes and flatteries. France gained nothing by this war; but her people were ruined, and her navy destroyed.

The king now sank completely under the control of Mme. de Pompadour, who was both concubine and procuress, and to whom he gave notes on the treasury for enormous sums, amounting in all to hundreds of millions of livres. War broke out again with Britain concerning the boundaries of Acadia (Nova Scotia), and was for some time prosecuted with considerable vigor. In 1756 an extraordinary alliance was formed between France and Austria, contrary to the policy of ages, and chiefly through the influence of Mme. de Pompadour; but as she disposed of the command of the French armies at her pleasure, success did not attend their operations. The state of the finances, the dispirited condition of the army, and the outcry of the distressed people were not sufficient to induce the king to make peace; but governed by his mistress, he obstinately persevered in war, even after the terrible defeat of Minden in 1759; whilst the British conquered almost all the French colonies both in the East and West Indies, with cape Breton and Canada. A peace, most humiliating to France, was at last concluded in 1763.

Louis, although indifferent to the ruin of his people, and to everything but his own vile pleasures, was reluctantly compelled to take part in the contest between Mme. de Pompadour and the Jesuits, the result of which was the suppression of the order in 1764. See JESUITS. The parliaments, emboldened by their success in this contest, now attempted to limit the power of the crown, by refusing to register edicts of taxation; but the king acted with unusual vigor, maintaining his own absolute and supreme authority, and treating the attempt of the parliaments to unite for one object as rebellious. The duke of Choiseul was now displaced from office; a new mistress, Mme. Du Barry, having now come into the place of Mme. de Pompadour; and a ministry was formed under the duke d'Aiguillon, every member of which was an enemy of the parliaments, and an object of popular detestation. The councilors of the parliament of Paris were removed from their offices, and banished with great indignity; and an interim parliament was appointed (Jan., 1771), which duly obeyed the court. The princes of the blood protested against this arbitrary act, which deeply moved the popular indignation. The king, when told of the ruin of the country, and the misery and discontent of the people, only remarked that the monarchy would last as long as his life; and continued immersed in sensual pleasures and trifling amusements. He boasted of being the best cook in France, and was much gratified when the courtiers ate eagerly of the dishes which he had prepared. His gifts to Mme. Du Barry, notwithstanding the embarrassment of the finances, in five years amounted to 180,000,000 of livres. At last, Louis, who had for some time suffered from a disease contracted through vice, was seized with small-pox, the infection of which was communicated by a young girl who had been brought to him, and on May 10, 1774, he died, so far from being regretted that his funeral was a sort of popular festival, and was celebrated with pasquils and merry ballads. His death-bed was one of extreme misery. He was succeeded by his grandson, Louis XVI.

LOUIS XVI., AUGUSTE, king of France, b. Aug. 23, 1754, was the third son of the dauphin, Louis, only son of Louis XV. He was styled duke de Berry, until, by the death of his father and his elder brothers, he became dauphin. He had a vigorous frame, was fond of hunting and manly exercises, took great pleasure in mechanical labors, and showed an aptitude for geometry, but none for political science. In the

midst of the most corrupt of courts, he grew up temperate, honest, and moral. He was married on May 10, 1770, to Marie Antoinette, the youngest daughter of the empress Maria Theresa.

When Louis ascended the throne, misery and discontent prevailed throughout France. He had not the vigor and judgment necessary for circumstances full of difficulty, and was conscious of his own weakness. He made Maurepas, an old courtier, his prime minister; but among his ministers were Malesherbes, Turgot, and other men of known patriotism; and his accession was signalized by the remission of some of the odious taxes, the abolition of the last relics of serfdom, the abolition of the torture in judicial investigations, a reduction of the expenditure of the court, and the foundation of institutions for the benefit of the working-classes. He was, for a time, extremely popular; but deeper reforms were rendered impossible by the opposition of the privileged classes. In June, 1777, when the state of the finances seemed nearly desperate, Necker (q.v.) was called to the office of general director of them, and succeeded in bringing them to a more tolerable condition, without any very radical change; but from the interference of France in the American war of independence, he was obliged to propose the taxation of the privileged classes, hitherto exempted. Their resistance compelled him to resign; and Joly de Fleury succeeded him; but the general discontentment induced the king, in 1783, to appoint Calonne (q.v.) comptroller-general, who found money for a time by borrowing, much to the satisfaction of the courtiers. But the indignation of the people increasing, Calonne found it necessary to recommend the convening of an assembly of the notables. On May 1, 1787, the archbishop Loménie de Brienne became finance minister. He obtained from the notables some concessions and some new taxes. But the parliament of Paris refused to register the edict of taxation, as oppressive to the people; and the extravagance of the court and the queen began to be freely spoken of. The convening of the states-general now began to be demanded from every corner of France. The king registered the edicts in a *lit de justice*, and banished the councilors of parliament to Troyes; but ere long found it necessary to recall them, and experienced from them even a stronger opposition than before. On May 8, 1788, he dissolved all the parliaments, and established a new kind of court (*cour plénière*) instead; but this act of despotism set the whole country in flames. Matters became still worse, when on Aug. 16, appeared the famous edict, that the treasury should cease from all cash payments except to the troops. Brienne was compelled to resign, and Necker again became minister. An assembly of the states of the kingdom was resolved upon; and by the advice of Necker, who wished a counterpoise to the influence of the nobility, clergy, and court, the third estate was called in double number.

The subsequent history of Louis is given at length under the head FRANCE. All readers of history are familiar with the melancholy incidents of his life, from the opening of the assembly of the states (May 5, 1789), down to his tragic execution. At 10 o'clock in the morning of Jan. 21, 1793, he died by the guillotine, in the Place de la Révolution. Great precautions were taken to prevent any rescue. As the executioner bound him, Louis tore himself free, and exclaimed: "Frenchmen, I die innocent; I pray that my blood come not upon France." The rolling of drums drowned his voice. Ere the guillotine fell, the abbé Edgeworth, his confessor, cheered him with the words: "Son of St. Louis, ascend to heaven!"

LOUIS XVII., CHARLES, second son of Louis XVI. of France, b. at Versailles, Mar. 27, 1785, received the title of duke of Normandy, till, on the death of his brother in 1789, he became dauphin. He was a promising boy. In the earlier days of the revolution he was sometimes dressed in the uniform of the national guard, and decorated with the tricolor, to gratify the populace. After the death of his father he continued in prison —at first with his mother, but afterwards apart from her—in the temple, under the charge of a coarse Jacobin shoemaker named Simon, who treated him with great cruelty, and led him into vicious excesses, so that he became a mere wreck both in mind and body. After the overthrow of the terrorists he was—perhaps intentionally—forgotten, and died June 8, 1795. A report spread that he was poisoned, but a commission of physicians examined the body and declared the report unfounded.

LOUIS XVIII., STANISLAS XAVIER, the next younger brother of Louis XVI., b. at Versailles, Nov. 17, 1755, received the title of count de Provence. In 1771 he married Maria Josephine Louisa, daughter of Victor Amadeus III. of Sardinia. After the accession of Louis XVI. to the throne he assumed the designation of *monsieur*, and became an opponent of every salutary measure of the government. He fled from Paris on the same night with the king, and was more fortunate, for, taking the road by Lille, he reached the Belgian frontier in safety. With his brother, the count d'Artais, he now issued declarations against the revolutionary cause in France, which had a very unfavorable effect on the situation of the king. The two brothers for some time held a sort of court at Coblentz. Louis joined the body of 6,000 emigrants who accompanied the Prussians across the Rhine in July, 1792, and issued a manifesto even more foolish and extravagant than that of the duke of Brunswick. After the death of his brother, Louis XVI., he proclaimed his nephew king of France, as Louis XVII., and in 1795 himself assumed the title of king. The events of subsequent years compelled him frequently to change his place of abode, removing from one country of Europe to another, till at last,

in 1807, he found a refuge in England, and purchased a residence, Hartwell, in Buckinghamshire, where his wife died in 1810, and where he remained till the fall of Napoleon opened the way for him to the French throne. He landed at Calais on April 26, 1814, and entered Paris, after 24 years' exile, on May 3; and the nation received the constitutional charter from his hands on June 4. See FRANCE.

The conduct of the government, however, was far from being constitutional or liberal. The nobles and priests exercised an influence over the weak king which led to severe treatment of the imperialists, the republicans, and the Protestants. Then followed Napoleon's return from Elba, when the king and his family fled from Paris, remained at Ghent till after the battle of Waterloo, and returned to France under protection of the duke of Wellington. He issued from Cambrai a proclamation in which he acknowledged his former errors, and promised a general amnesty to all except traitors. Again, however, he followed in many things the counsels of the party which detested all the fruits of the revolution. But the chamber of deputies, elected with many irregularities, was fanatically royalist, and the king, by advice of the duke de Richelieu, dissolved it; whereupon arose royalist plots for his dethronement, and the abolition of the charter. Bands of assassins were collected by nobles and priests in the provinces, who slew hundreds of adherents of the revolution and of Protestants, and years elapsed ere peace and good order were in any measure restored. Louis died Sept. 16, 1824.

LOUIS (properly **LUDWIG**) **THE GERMAN**, the third son of Louis le débonnaire, was b. about 805, and by the treaty at Verdun, in 843, Louis obtained Germany, and became the founder of a distinct German monarchy. He died at Frankfort, Aug. 28, 876. His kingdom was divided amongst his three sons: Carlmann obtaining Bavaria, Carinthia, and the tributary Slavonic countries; Louis obtaining Franconia, Thuringia, Saxony, and Friesland; Charles the fat obtaining Swabia, from the Main to the Alps. See CARLOVINGIANS.

LOUIS THE GREAT, King of Hungary. See HUNGARY, *ante*.

LOUIS II., Roman Emperor (see CARLOVINGIANS, *ante*), 822–75; the oldest son of Lothaire I., and reigned 855–75. By the treaty of Verdun, the empire, after the death of Louis le débonnaire, was divided between his three sons, Lothaire I., Louis the German, and Charles the bald. Italy was assigned to Louis II., who took the title of emperor; Charles took Provence and Lyons; and Lothaire II. the region called Lotharingia, or Lorraine. Louis II. defeated the Saracens at Benevento in 848, and expelled them from Bari. He established his authority over the great families of Italy, many of whom conspired with the Byzantine empire. Charles having died without children in 863, his brothers, Louis II. and Lothaire II., divided his dominions between them. Lothaire II., six years later, also died without issue, when Charles the bald and Louis the German seized and divided his dominions. Louis II. d. at Brescia, leaving no male issue, whereupon his two uncles seized his dominions, the province of Lorraine falling to Germany.

LOUIS III., THE CHILD, Roman Emperor (see CARLOVINGIANS, *ante*), 893–911; raised to the throne of Germany on the death of his father, Arnulf in 899 by duke Otto of Saxe, margrave Luitpold of Austria, and archbishop Hatto of Mentz, it being their desire to govern the country during his minority. Germany was in a wretched condition under their rule, and the Hungarians seized this opportunity and devastated it as far as Thuringia. In the death of Louis III., who reigned 908–11, the Carlovingian dynasty was extinguished in Germany.

LOUIS, PIERRE CHARLES ALEXANDRE, 1787–1872; b. in the department of Marne, France; graduated in medicine at Paris 1813, and afterwards entered the *hôpital de la charité*, and pursued the study of pathological anatomy. In 1825 he published *Recherches Anatomico-pathologiques sur la Phthisie;* and in 1826 *Recherches sur la Membrane Muqueuse de l'Estomac*, of which a second edition was published in 1843. These works gained him admission to the academy of medicine. In 1828 he was one of the commission sent to Gibraltar to investigate yellow fever. There also appeared in 1828 his *Recherches sur la Fièvre Typhoïde*, republished in 1841; *Examen de l'Examen de Broussais*, in 1834; and in 1835 *Recherches sur la Effets de la Saignée dans Quelques Maladies Inflammatoires.* He retired from practice in 1854, having won a great reputation as a medical scientist. He was one of the most prominent in the profession to advocate the importance of statistics in medical investigations. He died in Paris.

LOUISA, a s.e. co. of Iowa, 400 sq.m.; pop. '80, 13,146; traversed by the Burlington, Cedar Rapids and Minnesota railroad, and watered by the Iowa river. The surface is level, and the soil fertile, broad bottom lands occurring at intervals. The most important productions are cattle, grain, and wool. Co. seat, Wapello.

LOUISA, an e. central co. of Virginia, 460 sq.m.; pop. '80, 18,941. The surface is irregular, the soil productive, tobacco and grain being the staples. There are no important manufactures except flour. The Chesapeake and Ohio railroad intersects this county. Co. seat, Louisa Court-House.

LOUISA (LUISE AUGUSTE WILHELMINE AMALIE), Queen of Prussia. See LUISE, *ante*.

LOUISA ULRICA, 1720–82, Queen of Sweden; sister of Frederic the great; b. in Berlin; married in 1744 the crown-prince Adolphus Frederick of Sweden, afterwards king. She was a woman of rare intelligence. Through her influence the great botanist Linnæus was enabled to publish his system. The academy of belles-lettres and history and the musuem at Stockholm, as well as a library and art-museum at Drottingholm, were founded through her influence. She was mother of Gustavus III. and Charles XIII.

LOUISBURG, a t. in s.e. Nova Scotia, on the Atlantic coast, at the mouth of a small estuary; is the terminus of a railroad 30 m. in length from Sydney across the co. of Cape Breton. It had formerly a finely built stone fortress, mounting 65 cannon and 16 mortars, erected by emigrants from the French settlements after the peace of Utrecht in 1713, and named in honor of Louis XIV. The harbor was defended by a high wall and a ditch 80 ft. wide, a battery of 30 guns on Goat island, and another, the "royal battery," farther down the harbor, mounting 30 guns. These fortifications, built in 30 years and costing $5,550,000, were destroyed by the British in less than three months at an expense of $50,000. In 1745 the legislature of Massachusetts Bay, on account of the danger menacing its fisheries from the proximity of a fortified town belonging to the French and the shelter given to the privateers of a country with which they were at war, by the advice of gov. Shirley and a majority of one vote in a secret session, sent a force of 3,250 men of the state militia, under command of William Pepperell, with 516 men of Connecticut and 304 of New Hampshire, with a fleet of 100 New England vessels and a squadron under the British commodore Warren, against the town, which landed in its vicinity April 30. The siege ended June 17, 1745, by the surrender of 1600 Frenchmen under Duchambon. The English also captured a large ship in the harbor coming with reinforcements for the French; and on their triumphant entrance to the town the same drums were beaten that, 30 years afterward, were beaten at Bunker Hill. In 1748 the place came again under French rule as one of the results of the peace of Aix-la-Chapelle. In 1757 6,000 regulars, 4,000 men from New England, and others from New York and New Jersey, were ordered to report at Halifax for the purpose of making an attack on Louisburg, but were disheartened by the prospect of a well-garrisoned fort and 17 French ships of war moored in the harbor, and discreetly withdrew. In 1758 the town was bombarded by 14,000 British troops under gen. Amherst, with a fleet including 20 ships of the line, 18 frigates, and some smaller vessels, sailing from Halifax. The surrender of the French garrison of 3,100 men, under the chevalier de Drucourt, and a fleet of 8 ships, occurred July 26, 1758; and 5,637 soldiers and sailors were taken prisoners. It had formerly a pop. of 3,000 in a well-built town on the s. side of the harbor, and had a large trade in codfish, exporting annually 500,000 quintals, employing (while under French dominion) for this and other branches of trade, and in the fisheries, 600 vessels. Under English government its trade has diminished, and a convenient harbor, one-half mile wide at the entrance, is used simply as a stopping-place for steamships. It is occupied by about 300 fishermen, and has a light-house on the e. side of the harbor.

LOUIS-D'OR (i.e., *golden Louis*), a gold coin which was introduced into France in 1641, and continued to be coined till 1795. It was introduced in consequence of the prevalent custom of clipping and otherwise defacing the then coins of the realm, from which malpractices it was thought to be in some measure secured by its border. The old coins were called in. The louis-d'or ranged in value from about 16s. 7d. to 18s. 9¾d. sterling. Some louis-d'ors bear special names, chiefly derived from the figure exhibited on the obverse side.—In some parts of Germany, the larger gold pieces, of five thalers or thereby, are often popularly called *louis-d'or*, and the name is also occasionally applied to the French *napoleon or 20-franc piece.*

LOUISIA'NA, one of the United States of America, bounded on the s. by the gulf of Mexico, and on the w. by the state of Texas. It is 290 m. from e. to w., and 200 from n. to s., having an area of 41,346 sq.m., or 26,461,440 acres. The principal rivers are the Mississippi—which has a course of 800 m. in this state, and whose delta traverses its southern half—Red river and the Washita, and their branches. The principal towns are New Orleans (the capital) and Baton Rouge, on the Mississippi. The coast line, a portion of the shore of the gulf of Mexico, is 1256 m. in length. The surface is flat, rising nowhere more than 200 ft., and of alluvial formation. A large portion of the state is below the high-water level of the rivers, and is protected by dikes, called *levées*, from inundations. The land is generally of great richness, producing sugar-cane, cotton, rice, maize, tobacco, oranges, bananas, figs, peaches, etc. In the forests are several kinds of oak, hickory, locust, sassafras, mulberry, etc. In 1860 Louisiana produced 221,776 hogsheads of sugar and 13,439,772 gallons of molasses; in 1870 these figures had fallen to 80,706 and 4,585,150; in 1877 the produce of sugar was 127,753 hogsheads. Louisiana ranks fifth among the cotton-raising states. In 1879 the public debt was $11,724,800, funded. There are 6 colleges in Louisiana, near 1000 schools, numerous public libraries, and in 1878, 89 periodicals. Louisiana was settled by the French in 1699; in 1716 it was granted to John Law, who based upon his grant the famous Mississippi company; ceded to Spain in 1762; re-ceded to Napoleon I. in 1800; purchased in 1803 by the United States for $15,000,000; and admitted as a state in 1812. Invaded by the British troops in 1814 under gen. Packenham, New Orleans was success-

fully defended by gen. Jackson. The population, mostly Creoles, was, in 1870, 710,304; in 1875, 857,039.

LOUISIANA (*ante*). In 1541 De Soto visited and explored the region around New Orleans, and, dying in the following year, was buried in the waters of the Mississippi. In 1673 father Marquette and his Canadian followers descended the river to its mouth, but founded no settlement. In 1682 La Salle descended the river and took possession of the country in the name of Louis XIV., in whose honor he named it Louisiana. It is believed, however, that no colony was founded before Iberville in 1699, with a number of colonists, settled in Biloxi, now in Alabama. Iberville, dying soon afterwards, was succeeded by Bienville, who, after he and his colonists had endured great privations, led them to the present site of New Orleans in 1706, where they made a stand and unfurled the flag of France. The colony languished, but the colonists did not abandon their post. In 1712 Louis XIV. gave to Anthony Crozat, a Paris merchant, the exclusive privilege for 15 years of trading in all this vast region, of sending a ship once a year to Africa for a cargo of slaves, and of working the mines, one-fourth of the products of which Crozat agreed to pay over to the king. In 1717 he relinquished the colony as unprofitable, and the province fell into the hands of John Law, the great speculator, who soon came to financial disaster, and was followed by Bienville, who built up the town of New Orleans, which was made the capital of the colony in 1723. The affairs of the new settlement remained under the direction of the French crown until 1762, when the province was secretly transferred to Spain, which ruled it with a rod of iron for 38 years, when in 1800 it was restored to France. Three years later it was sold to the United States for $15,000,000. At that time it embraced nearly all of the present states of Louisiana, Arkansas, Missouri, Iowa, Minnesota, Dakotah territory, most of Kansas and the Indian territory, part of Colorado, most of Wyoming, and the whole of Montana, Idaho, Oregon, and Washington territory. In 1804 the southern portion of this vast region was organized by congress as the territory of Orleans. In 1810 another part of the state, lying between the Mississippi and the Amity and Pearl rivers, was annexed to Orleans; and in April, 1812, the territory as thus constituted was admitted to the union as a state, with the name of Louisiana. Three months after this the United States declared war against Great Britain. The war continued a little over two years, the treaty of peace being signed at Ghent, Dec. 24, 1814. Before news of the peace could cross the ocean a British force of 12,000 men, led by sir John Packenham, landed on the coast of Louisiana and made an attack upon New Orleans, which was successfully resisted by gen. Jackson with only 5,000 men, mostly militia from Tennessee and Kentucky. The progress of the state after this was rapid.

The surface of Louisiana is mostly low and level, much of the southern part especially being not more than 10 ft. above the sea-level and liable to frequent inundations from the rivers. The delta of the Mississippi is full of swamps, and the coast is lined with salt marshes. The land along the Mississippi below New Orleans and 120 m. above is below the surface of the river at high water, and protected from inundation by artificial embankments called levees. A breach in a levee, called in the language of the country a crevasse, sometimes occurs, inundating hundreds of thousands of acres of valuable land and destroying the growing crops. The northern and western part of the state is somewhat broken by low hills, nowhere rising above 200 feet. The river bottoms are exceedingly fertile, and the alluvial land is easily drained. The latter is heavily timbered, and covered with a thick undergrowth of cane. The prairies are better fitted for grazing than for culture. The hilly portion of the state consists mainly of pine barrens, on which are found oak, elm, cypress, honey-locust, and other timber. Among the forest trees of the state are the ash, walnut, hickory, poplar, mulberry, magnolia, cotton-wood, maple, buckeye, willow, paw paw, pecan, dogwood, and persimmon. The wild cane sometimes grows to a height of 30 feet. Among the fruit trees are the quince, plum, peach, fig, orange, lemon, and lime. The orange grows only in the southern, the apple only in the northern, section. The chief agricultural staples are cotton, sugar, rice, and corn. The rice and sugar plantations are found only in the southern part of the state, below lat. 30°, upon the alluvial lands along the Mississippi. Nearly all the sugar made in the United States is produced here. It is a somewhat uncertain crop. The mineral productions of the state are unimportant. Rock salt of unknown depth is found at Petit Anse upon an area of more than 140 acres, and in Calcasieu parish are deposits of gypsum and sulphur. There are salt wells in Bienville, Natchitoches, and Winn parishes.

The climate of s.e. Louisiana is to some extent malarious; but the northern and western sections are healthful, and much visited by consumptives, who are generally benefited by a residence there. By careful attention to sanitary laws New Orleans has become far more healthful than it formerly was. Owing to the prevalence of northern winds, the winter months in Louisiana are more severe than in other regions of a corresponding latitude. The summers are long and hot. The mean annual temperature at New Orleans is about 67°; that of the warmest month, 82°; of the coldest, 46°. The Mississippi, one of the largest rivers in the world, has a course of nearly 600 m. in the state.

The Red river enters the n.e. corner of the state from Arkansas and flows in a s.e.

direction till it reaches the Mississippi some 40 m. below Natchez. Near its mouth it receives the Washita, which also enters the state from Arkansas and flows almost due-south. Its other affluents are the Dugdemona, the Sabine bayou, and the Bastineau river and lake. The Sabine river forms in part the western boundary of the state. The Pearl, the Tangipahoa, Tickfaw, and Amite are the principal streams e. of the Mississippi. There are besides several large bayous and estuaries, which are but secondary mouths of the Mississippi. The chief of these are the Atchafalaya, with its series of lakes, the Vermillion, the bayou Teche, bayou de Large, and bayou la Fourche. Lakes Pontchartrain, Borgne, Maurepas, Sabine, Calcasieu, Mermenteau, Grand, Marsh, Charles, Grand Chenière, Callou, etc., are all estuaries, their waters being salt from communication with the gulf of Mexico, and connected with rivers or bayous. The islands off the coast produce sea-island cotton of the finest quality.

The wild animals of the state are the black bear, wolf, panther, wild-cat, raccoon, otter, polecat, opossum, squirrel, etc.; the alligator inhabits the bayous. Among the reptiles are the rattlesnake, horned-frog, lizard, viper, moccasin snake, etc. Among the birds are the gray and bald eagle, the king vulture, the turkey buzzard, hawk, owl, gull, pelican, crane, heron, wild-turkey, wild-goose, pigeon, wild-duck, etc.

The number of acres of improved farm land in 1870 was 2,045,640; cash value of farms, $68,215,420; estimated value of all farm products, $52,006,622. The value of farm implements and machinery in 1870 was $7,159,333; wages paid during the year, $11,042,789; value of orchard products, $142,129; of produce of market gardens, $176,969; wheat product, 9,906 bush.; corn, 7,596,628 bush.; sweet potatoes, 1,023,706 bush; rice, 15,854,012 lbs.; wool, 140,428 lbs.; cotton, 350,832 bales; milk sold, 833,928 galls.; cane molasses, 4,585,150 galls.; cane sugar, 80,706 hogsheads. The number of pounds of sugar raised in several successive years and the value thereof are thus stated: 1875-76 165,450,000 lbs., valued at $11,578,000; 1876-77, 194,964,000 lbs., valued at $15,646,000; 1877-78, 149,469,000 lbs., valued at $9,007,000. The product of molasses in 1877-78 was 13,576,374 galls. The rice crop of 1877 was 140,785 bbls.; that of 1877-78, 157,770 bbls. The orange crop is becoming important, but there are no accurate statistics of its increase. The cotton product of 1872 was 434,000 bales; that of 1877, 645,000 bales. The sugar crop of 1877 was 208,841 hogsheads. The manufactures of the state, aside from sugar, are not very extensive. In 1870 there were 2,557 establishments, including the sugar mills on the plantations; capital invested, $18,313,974; wages paid, $4,593,470; value of products, $24,161,905, of which sum $10,341,858 was credited to sugar alone. The other branches of manufacture were: lumber, bakery products, iron-castings, tobacco and cigars, clothing, flouring mill products, railroad cars, machinery, cotton-seed oil, ship-building, and malt liquors. Since 1870, 2 cotton factories and 5 sugar refineries have been established. The assessment of property for taxation in 1878-79 was estimated at $177,000,000.

In domestic and foreign exports, Louisiana ranks next to New York. Its exports of domestic products for the year ending June 30, 1874, were valued at $93,478,513. The imports of 1874 were estimated at $14,548,056. The value of inward-bound coastwise cargoes to New Orleans in 1872 was $160,000,000. The coastwise and foreign trade together amount probably to not less than $400,000,000 annually. In 1874, 2,928 vessels entered the ports of the state, having an aggregate tonnage of 1,640,676 tons, and being manned by 51,864 persons. In the same year 3,042 vessels cleared from the same ports, with an aggregate tonnage of 1,743,312 tons, and manned by 49,956 men. The domestic exports from New Orleans for the year ending June 30, 1879, were valued at $63,624,797; the imports for the same period amounted to $7,141,989. The increase in the depth of water at the mouths of the Mississippi, by means of jetties, has had a visible effect upon the commerce of New Orleans.

In 1873 there were in the state 8 national banks, with a capital of $4,150,000. Other banks, organized under state laws, had capitals amounting to about the same sum. There were also several savings banks and insurance companies. The pop. of the state in 1870 was 726,915, of whom 362,065 were white and 364,210 were colored. In 1874 the number of miles of completed railroad was 445, the chief lines being the Clinton and Port Hudson; the Baton Rouge, Gross Tête and Opelousas; the New Orleans, Jackson and Great Northern; the North Louisiana and Texas; the Texas and Pacific. Short canals connect the navigable waters around New Orleans.

The state institutions are the penitentiary at Baton Rouge, the insane asylum at Jackson, the charity hospital at New Orleans, and the institutions for the deaf and dumb and blind at Baton Rouge. The public debt of the state in 1878 amounted to $11,785,293. There was a failure to pay the interest falling due upon this debt Jan. 1, 1879.

The public school fund includes: 1, the sum of $1,130,867, the avails of lands granted by the United States for the support of free schools, on which the state pays an annual interest of 4 per cent; 2, proceeds of such taxation as the legislature may levy for the purpose; 3, any lands or other property bequeathed to the state for schools; 4, all property or funds, other than unimproved lands, bequeathed to the state and not designated for other purposes; 5, avails of lands escheated to the state. The constitution provides for the election of a superintendent of public education for a term of 4 years. Colored children are not allowed to attend the same schools with white children. According to

the report of the state superintendent for 1873 there were in the state 272,334 persons of school age; number of school districts, 483; of public schools, 864; teachers, 1296, of whom 685 were males and 611 females; average salary of teachers per month, $42.50; estimated value of school property, $661,962; average daily attendance in 34 parishes, 35,061. In 7 parishes no schools were reported. The number of private schools reported was 296, with 794 teachers and 21,434 pupils. The principal colleges of the state are the Louisiana state university; the New Orleans university (Methodist); St. Mary, Jefferson (Roman Catholic); Centenary (Methodist); Straight university (non-sectarian, but under Congregational auspices). The New Orleans and Straight universities are open to all, without distinction of race or sex. The Louisiana state agricultural and mechanical college was established in New Orleans in 1874. It is supported in part by the avails of the land received from congress for that purpose under the act of 1862. The legislature in 1880, in compliance with an express provision of the constitution, passed an act to establish in New Orleans a university for persons of color, to be known as "Southern university." The number of libraries reported in 1870 was 2,332, containing 847,406 volumes. There were at the same time 7 daily, 1 tri-weekly, 8 semi-weekly, and 75 weekly newspapers, about 20 of them being printed wholly or partly in French. The number of church organizations was 638, owning 599 edifices, valued at $4,048,145.

A new constitution, framed by a convention held for the purpose, was ratified by the people Dec. 8, 1879, by a vote of 86,494 in the affirmative to 27,346 in the negative. The governor is elected by the people for 4 years, and receives a salary of $4,000. The general assembly is composed of a senate and house of representatives; the former to consist of not more than 36 nor less than 24, and the latter of not more than 98 nor less than 70 members, to be elected for 4 years, and to receive $4 per day while engaged in the performance of their duties. The assembly meets biennially, and its sessions are limited to 60 days. The supreme court is composed of one chief-justice and three associate justices, appointed for 12 years by the governor, with the advice and consent of the senate; their salaries are $5,000 each, and the court, with some special exceptions, has only an appellate jurisdiction. The state is divided into 4 supreme court districts. The courts of appeal, one for each of five circuits, are each composed of two circuit judges, elected for 8 years by the two houses of the general assembly in joint session; salaries, $4,000. These courts have no other than an appellate jurisdiction. The district courts are each composed of a single judge elected by the people of the district for 4 years, and paid a salary of $3,000. These courts have a very wide jurisdiction, but their decisions are subject to review by the higher courts. The districts must be not more than 30 nor less than 20 in number, at the discretion of the legislature. Special courts are provided for the city of New Orleans. New Orleans is the seat of government. Lotteries may be authorized by the legislature until 1895, beyond which time they are absolutely prohibited. The legislature, however, in 1880, exercising the discretion which the constitution allows, passed an act of prohibition. Women over 21 years of age are eligible to any office of control or management under the school laws.

Louisiana was one of the first states to secede from the union, the ordinance of secession having been adopted in convention Dec. 23, 1860, by a vote of 117 to 113. The same convention adopted the confederate constitution and passed amendments to the state constitution conforming it thereto. The people had no opportunity to vote upon the question, except in electing delegates to the conventions. The new state government maintained a nominal existence until near the close of the rebellion, though most of the state, after the capture of New Orleans by admiral Farragut in April, 1862, was in possession of the union forces. The city was handed over to the army, and governed successively by gens. Butler and Banks. The latter, in 1863, made an excursion into the Attakapas region, along the bayou Teche, and succeeded in establishing there the authority of the United States. In the spring of 1864 he ascended the Red river with a large force, but was compelled to retreat after several disastrous battles. In April, 1864, a convention of a portion of the people of the state adopted a new constitution and sought readmission to the union, but congress denied the request. A second convention was held and another constitution adopted in 1868. This constitution was accepted by congress upon certain conditions, which were subsequently complied with; and on July 13, 1868, the government was relinquished by the military and handed over to the civil authorities. During the three years of military occupation which followed the rebellion, there were great political and social disturbances; and after the readmission of the state to the union there were for a time conflicts of authority of a most unpleasant and dangerous character. The electoral votes of Louisiana for president and vice-president of the United States have been cast as follows: 1812, 3 for Madison and Gerry; 1816, 3 for Monroe and Tompkins; 1820, 3 for Monroe and Tompkins; 1824, 3 for Jackson and 2 for Adams for president, and 5 for Calhoun for vice-president; 1828, 5 for Jackson and Calhoun; 1832, 5 for Jackson and Van Buren; 1836, 5 for Van Buren and R. M. Johnson; 1840, 5 for Harrison and Tyler; 1844, 5 for Polk and Dallas; 1848, 6 for Taylor and Fillmore; 1852, 6 for Pierce and King; 1856, 6 for Buchanan and Breckinridge; 1860 and 1864, no vote; 1868, 7 for Seymour and Blair; 1872, 8 not counted; 1876, 8 for Hayes and Wheeler.

LOUISIANA, a city of Missouri, in Pike co., on the Mississippi river, 115 m. above St. Louis, and on the Chicago and Alton railroad, which crosses the river at this point;

pop. 3,639; has 10 churches, 2 weekly newspapers, 1 college, 1 public library, a fine public school, public gas works, a paid fire department, 2 foundries, and several tobacco manufactories. It is the seat of an extensive lumber business, and the center of a fine fruit-growing region.

LOUIS NAPOLÉON, whose full name was CHARLES LOUIS NAPOLÉON BONAPARTE, and his titular designation, *Napoléon III., Emperor of the French*, was b. at Paris, in the palace of the Tuileries, April 20, 1808. He was the third son of Louis Bonaparte, brother of the first emperor. See BONAPARTE FAMILY. His birth was celebrated with great rejoicings throughout France, as that of an heir to the imperial throne, for by the law of succession (dated 28th Floreal, year 12, and 5th Frimaire, year 13), the crown, in default of direct descendants of the emperor himself—and he at that time had none—could be inherited only by the children of two of his brothers, Joseph and Louis. But Joseph was also childless, and the sons of Louis, in consequence, became heirs apparent. After the restoration of the Bourbons, the ex-queen Hortense, mother of Louis Napoleon, went into exile, carrying with her her two sons, Napoléon Louis and Louis Napoléon. Since 1810 she had been separated from her husband. Louis received his early education in the castle of Arenenberg, on the shores of lake Constance, where his mother resided. He was furnished with the best tutors that could be got, and was far from proving a slothful pupil. At the gymnasium of Augsburg, he displayed quite a passion for history and the exact sciences. His love of athletic sports was equally conspicuous: he was one of the best fencers, riders, and swimmers in the whole school. In Switzerland, his inclination and aptitude for military strategy, especially in artillery and engineering, was first developed. He even served for some time as a volunteer in the federal camp at Thun, and at a later period in his life wrote a *Manuel d'Artillerie* (Zürich, 1836). In 1830, when an insurrection broke out in the pontifical states, Louis Napoléon and his brother took part in it. The latter died at Forli, and Louis Napoléon himself fell dangerously ill at Ancona, and was only saved by the tender devotedness of his mother. The Austrian occupation of Ancona forced them to quit the city secretly; they proceeded to France, but their incognito being betrayed, they were expelled by Louis Philippe, after a few days, and crossed over to England, whence they soon retured to Switzerland. Such, however, was the charm of Napoléon's name that the chiefs of Polish insurrection offered him, in 1831, the command of their legions, "as the nephew of the greatest captain of all ages," and also the crown of Poland. The capture of Warsaw by the Russians, however, put a stop to further proceedings in this matter, and Louis Napoléon once more turned to his silent and somber studies. The death (July 22, 1832) of the duke of Reichstadt, sometimes called *Napoléon II.*, only son of the first emperor, opened the future to his ambitious hopes; and even his supporters admit that, from this date forward, his whole life, speculative and practical, was devoted to the realization of what now became his "fixed idea;" viz., that he was destined to be the sovereign of France. Between 1832 and 1836 he published several works, which not only kept him prominently before the French public, but evoked a considerable amount of political and intellectual sympathy. We may mention his *Rêveries Politiques; Projet de Constitution; Deux Mots à M. de Chateaubriand sur la Duchesse de Berri* (in verse); and *Considérations Politiques et Militaires sur la Suisse.* In 1836, believing in the instability of the throne of Louis Philippe, and in the general disaffection of the *bourgeoisie*, encouraged also by the proofs of vivid attachment to his person displayed by nearly the whole of the democratic party, but, above all, confiding in the grandeur of those memories which his name recalled, he, with a few associates, among whom was the comte de Persigny, since better known, made his famous attempt at a *coup d'état* at Strasbourg. It was, as the world knows, a ludicrous failure. Louis Napoléon was taken prisoner under humiliating circumstances, and after some days conveyed to Paris; but the government of Louis Philippe was afraid to bring a Bonaparte to trial—as in such a case it could not rely upon the impartiality of a French jury—and in consequence shipped him off to America. The illness of his mother soon caused him to return to Europe. He found her dying; two months later, he received her last sighs (Oct. 3, 1837). Although the affair of Strasbourg had naturally enough caused many people to doubt the talent and particularly the judgment of Louis Napoléon, still Louis Philippe, who was, politically speaking, an extremely timid monarch, dreaded some new conspiracy, and, in consequence, the French government demanded of Switzerland the expulsion of the obnoxious prince from its territories, M. Molé actually enjoining the French ambassador to request his passports in case of a refusal. Switzerland was violently agitated, and was almost on the point of going to war for the distinguished refugee (who was, in fact, a Swiss citizen), when the latter resolved to prevent a rupture by leaving his adopted country. He now proceeded to England, and settled in London. With certain members of the British aristocracy, he came to live on a footing of considerable intimacy, and there can be no doubt that he was also an object of languid wonder and interest to the community generally, but he impressed nobody with a belief in his future and his genius; nay, Englishmen erred so far as to suppose that the "silent man" was merely "dull." In 1838 he published in London his *Idées Napoléoniennes*, which, read in the light of subsequent events, are very significant. Europe generally regarded them as idle dreams; but in France the book went through numerous editions. In 1839 Louis

Napoléon was in Scotland, and took part in the celebrated Eglinton tournament. Next year (1840), taking advantage of the sentiment aroused by the bringing home of the ashes of his uncle from St. Helena, he made another attempt on the throne of France at Boulogne. It was as grotesque a failure as the one at Strasbourg, and undoubtedly provoked a certain feeling of contempt for its author in the mind of the general public. Captured on the shore, while endeavoring to make his escape to the vessel that had brought him from England, Louis Napoléon was again brought to trial, and condemned to perpetual imprisonment in the fortress of Ham. Here he composed several works: *Aux Mânes de l'Empereur; Fragments Historiques; Analyse de la Question de Suisse; Réponse à M. de Lamartine;* and *Extinction du Paupérisme;* wrote political articles for the democratic journals, and actually took part in editing the *Dictionnaire de la Conversation*, a valuable French encyclopædia. After an imprisonment of more than five years, he made his escape (May 25, 1846), by the help of a Dr. Conneau, in the disguise of a workman, and gained the Belgian frontier, whence he returned to England. The revolution of Feb. (1848) caused him to hurry back to France, where he professed himself devoted to the views of the provisional government; the latter, however, requested him to leave the country. This he promised to do; but being elected deputy for Paris and three other departments, he took his seat in the constituent assembly, June 13, 1848. A stormy debate followed, and on the 15th he resigned his seat, and, either from policy, or patriotism, left France. Recalled to France in the following September by a quintuple election, he once more appeared in the assembly, and at once, through the agency of his zealous associates, commenced his candidature for the presidency. The masses were—rightly or wrongly—thoroughly in his favor. Out of seven and a half million of votes, 5,562,834 were recorded for prince Louis Napoléon; gen. Cavaignac, who was nearest to him, obtaining only 1,469,166. This fact is declared by the partisans of the emperor to be an absolute proof of his popularity, for at this period he had neither power nor money to force or bribe opinion. On Dec. 20 he took the oath of allegiance to the republic. For a few days concord seemed to be re-established between the different political parties in the assembly; but the beginning of the year 1849 witnessed the commencement of a series of struggles between the president and his friends on the one side, and the majority of the assembly on the other—the latter being profoundly penetrated with the conviction that Louis Napoléon was not devoted to the interests of the republic, but to his own. The French expedition to Italy and the siege of Rome were, above all, the causes of violent discussion in the chambers. This anarchic condition of things, in which, however, the president tenaciously held his ground, was summarily put a stop to by the famous or infamous (for opinions differ) *coup d'état*, Dec. 2, 1851. The principal actors in this midnight deed were the president himself, M. de Morny, M. de Maupas, and gen. St. Arnaud. The circumstances that marked it were of necessity odious and even atrocious; and there cannot be the shadow of a doubt that it engendered in the mind of Europe a distrust of the honesty of Louis Napoléon, which, perhaps, was never during his life wholly removed. His success was certainly magnificent, but the cost was also enormous. The feeble attempts at an armed resistance in Paris were put down by the military, who were favorable to the president, and under the command of his accomplices. A rigorous system of repression was put in force both in Paris and in the departments, and the deportation to Cayenne and Algeria became painfully familiar to the European public. France, as a whole, however, whether wearied of the incompetent democrats, or (as Kinglake supposes) "cowed" by the terrible audacity of the president, appeared to acquiesce in his act; for when the vote was taken upon it on the 20th and 21st of the same month, he was re-elected president for ten years, with all the powers he demanded, by more than 7,000,000 suffrages. His enemies affirm they were obtained by terrorism, and of course the same value cannot be placed upon this as on the previous expression of national confidence. Louis Napoléon was now emperor in fact; nothing was wanting but the name. This was assumed exactly a year after the *coup d'état*, in accordance, as it appeared, with the actual wish of the people. Among the events of his subsequent reign were the conspiracies against him (1853), the attempts at assassination (by Pianori, 1855, and Orsini, 1858), the Anglo-French alliance and the Crimean war (1854–56), the Franco-Italian war (1859), and the Mexican campaign (1863). In 1870 Louis Napoléon declared war against Prussia; and, after several terrible defeats, he surrendered himself a prisoner at Sedan in September. Till the conclusion of peace he was confined at Wilhelmshöhe. In Mar., 1871, he joined the empress at Chiselhurst, Kent; and resided there till his death, on Jan. 9, 1873.—In 1853 the emperor married Eugéne Marie, countess of Montijo. Their son, Eugéne Louis Jean Joseph, prince imperial of France, was born Mar. 16, 1856. He was in the field with his father in 1870, but after the fall of Sedan escaped to England, where he entered the Woolwich military academy, and in 1875 completed with distinction a regular course of study. Volunteering to serve with the English artillery in the Zulu campaign of 1879, he was killed in June, when reconnoitring, by a party of Zulus in ambush.

LOUIS PHILIPPE, King of the French, b. at Paris, Oct. 6, 1773, was the eldest son of Louis Philippe Joseph, duke of Orleans. He received at his birth the title of duke of Valois, and afterward that of duke of Chartres. His education was intrusted to the care of

the celebrated Mme. de Genlis. He entered the national guard, and became a member of the club of friends of the constitution, afterwards that of the Jacobins. Along with his father, he renounced his titles, and assumed the surname of Egalité. He showed both courage and capacity in the war; but his situation became very dangerous after the unsuccessful battle of Neerwinden, in which he commanded the center. He was included in the order for arrest issued against Dumouriez, and on April 4, 1793, escaped along with him into the Austrian territory. He sought in Switzerland a place of security for his sister Adelaide, wandered about amongst the mountains for four months, and accepted a situation as teacher of geography and mathematics in a school at Reichenau, near Chur, assuming the name of Chabaud-Latour. He afterwards wandered for some time in the n. of Europe, and then went to North America. In 1800 he took up his abode at Twickenham, near London, with his two younger brothers, both of whom soon after died. In 1809 he married Marie Amelie, daughter of Ferdinand I. of the Two Sicilies. On the fall of Napoleon, he hastened to Paris, where he was received with distrust by Louis XVIII. After the second restoration, he recovered his great estates, which the imperial government had sequestrated. Disliked by the court, he was very popular in Paris. He kept aloof, however, from political intrigues; and the three bloody days of the revolution of 1830 were nearly over ere he was brought forward, the banker Laffitte proposing in the provisional committee his appointment as lieut.gen. of the kingdom, from which he proceeded to the acceptance of a constitutional throne, Aug. 9, 1830. He defended his conduct towards the elder Bourbons by protesting that he acted for the welfare of France. He cultivated peaceful relations with foreign powers, sought to strengthen his throne by gaining the support of the middle classes, and repressed all the extreme parties by what became known as the *juste-milieu* (q.v.) policy. The extreme democrats hated him, and frequent attempts were made on his life, by *infernal machines* and otherwise. The country prospered under his government, but a demand for reform in the electoral system became loud and general, and was unwisely opposed by the king and the Guizot (q.v.) ministry: whilst the conduct of the former in the matter of the marriages of the queen of Spain and her sister, manifesting a disregard of every consideration but the interests of his own family, excited a strong feeling of indignation throughout Europe. The French nation became much excited; "reform banquets" began to be held; the government attempted to prevent them by force; insurrectionary movements ensued in the streets of Paris on Feb. 22, 1848; and the "citizen king" saw with alarm that the national guard could not be expected to support him. On Feb. 24, he abdicated in favor of his grandson, the count de Paris; but the chamber of deputies refused to acknowledge the boy as king. Louis Philippe, deserted by his courtiers, fled to the coast of Normandy along with his queen, concealed himself for some days, and at length found opportunity of escaping in a British steamboat to Newhaven under the name of Mr. Smith. The brief remainder of his life was spent in England. He died at Claremont, Aug. 26, 1850.

LOU'ISVILLE, a city of Kentucky, on the falls of the Ohio, 130 m. below Cincinnati. It is handsomely built, with broad streets on a level plain. Main street is 3 m. long. The city is supplied with water from the Ohio, and by artesian wells, one of which has a depth of 2,086 ft., a three-inch bore, and supplies 330,000 gallons of water in 24 hours, which rises to a height of 170 feet. The court-house cost $1,000,000. There is a fine custom-house, jail, a marine asylum, 10 orphan asylums, hospitals, houses of refuge, 95 churches, 5 daily and 16 other papers, several pork-packing establishments (at which, in 1873–74, 226,947 hogs were slaughtered), large leather and tobacco factories, etc. Steamers pass over the rapids of the Ohio at high water, but at other times pass through a canal and locks. Pop. 1870, 100,753. It was named Louisville (1780) in honor of Louis XVI. of France, whose troops were then assisting the Americans in the war of independence.

LOUISVILLE (*ante*), the chief city in Kentucky and co. seat of Jefferson co., is situated about midway of the length of the Ohio river; 400 m. from its mouth and 600 from its head at Pittsburg; pop. '80, 123,645. The falls or rapids of the Ohio have here a descent of 27 ft. in 2½ m., affording a fine water-power, not yet much utilized. The Louisville and Portland canal, through which steamboats pass when it is low water over the falls, is 2 m. long; has 3 locks, 480 ft. long and 90 ft. wide; and has a capacity for steamboats of 3,000 tons. It was built by the people of Louisville, the U. S. government contributing; and since 1874 has passed under the control of the latter, being free to commerce excepting a small charge levied for a fund for repairs. Formerly an unhealthy situation, subjected to malarial and bilious fevers, an adequate system of drainage and sewerage has remedied this; and it is now one of the healthiest of southern cities. It is laid out in broad streets, lined with shade trees in the portion devoted to private residences; the latter being built with lawns and gardens in front, making a most agreeable appearance. A number of important lines of railroad connect Louisville with the northern and southern railroad systems, including the Louisville, Nashville and Great Southern; Louisville, Paducah and Southwestern; Louisville, Cincinnati and Lexington; and the Jeffersonville and Indianapolis, New Albany and Chicago, Ohio and Mississippi, Louisville and St. Louis, etc. A bridge of stone and iron crosses the river at the head of the falls, having 27 spans, and a total length of 5,218⅔ ft., and which cost $2,016,819.63. An important industry is the sugar curing of

hams, and pork-packing. This city is also one of the largest markets for leaf-tobacco in the world, exporting enormous quantities to France, Germany, England, and the Dominion of Canada. There is also a very large and growing manufacture of cigars, 86 manufactories having made, in 1874, nearly 14,000,000 cigars. The manufacture of whisky is also an enormous business in Louisville, while it is the point of distribution for the excellent and popular whiskies made in the Kentucky distilleries. Other important manufactures are the Louisville cement, leather, furniture, iron pipe, etc. The city has an efficient paid fire department, with telegraph and signal system. An adequate police force, comprehensive street railway system, and excellent system of public schools, with its other manifest advantages, combine to place Louisville on a par with the other well-constructed and well-governed cities of the world.

LOU'LE, a t. of Portugal, in the province of Algarve, 6 m. n. by w. from Faro, and 130 m. s.e. from Lisbon. It is pleasantly situated on a hill amid groves of cork trees and pomegranates. The remains of a Moorish castle form a conspicuous feature in the scene. Loulé is one of the most thriving places in Portugal, and has more than doubled its population within the last 40 years. Baskets of aloe-thread are a principal article of manufacture. Pop. about 13,000.

LOURDES, a t. of s. France, department of Hautes-Pyrénées, on the right bank of the Gave-de-Pau, 24 m. s.e. of Pau; pop. 4,577. It is at the base of an almost inaccessible rock about 500 ft. high, on which is a fortress formerly possessed by the counts of Bigorre, but now used as a prison. The place was fortified by Julius Cæsar. Remains of Roman fortifications are found, and some curious grottoes in the vicinity. When the English held it in the 14th c., it was the center of their military operations, but after the treaty of Bretigny in 1460 it was evacuated by them. Manufactures of handkerchiefs and flax, and a general trade in agricultural produce, are carried on. It is a noted place of pilgrimage among Roman Catholics on account of the alleged appearance of the Virgin Mary to two girls, Feb. 14, 1858. In 1872 about 20,000 persons resorted to the grotto of the Virgin Mary. It is alleged that many miraculous cures have been wrought in answer to prayers offered at this shrine. In some, at least, of the many instances alleged, the fact of wonderful healing seems to be authenticated: the explanations of the fact vary greatly, according to the scientific or religious theories of the critic. One of the common explanations has been that the quickening of hope and imagination in certain susceptible natures has effected a cure by the operation of purely natural causes. This evidently leaves room for those who believe in healing by the power of prayer, to say that prayer is by a natural law the stimulant of hope; and that it in no wise derogates from the power of prayer to say that its place among the forces by which God governs the world is so sure that his answers to it flow along the lines of natural law. But perhaps the distinction between natural and supernatural may need to be revised.

LOUSE, *Pediculus,* a genus of insects, the type of a very numerous family, which forms the order *parasita* or *anoplura.* The body is flattened, almost transparent; the segments both of the thorax and abdomen very distinct; the mouth is small and tubular, inclosing a sucker; there are no wings; the legs are short, and are terminated by a claw adapted for taking hold of hairs or feathers. The eyes are simple, one or two on each side of the head. All the species are small, and live parasitically on human beings, terrestrial mammalia, and birds. They deposit their eggs on hairs or feathers, to which they attach them by a glutinous substance; and they multiply with astonishing rapidity. The young cast their skin several times before they reach their maturity, which in the best known species is said to be about eighteen days after they are hatched, but, from the first, they are very similar to their parents. Animals of different kinds are infested by different species of louse peculiar to them; those which are found on birds exhibiting characters considerably different from those of man and mammals. The same species is rarely found on different species of animals, unless very nearly allied; but some animals have more than one of these parasites. Three infest the human race: one confined to the head, the COMMON LOUSE (*P. capitis*); another, the BODY LOUSE (*P. vestimenti s. corporis*), very similar to it, but of a larger size; a third, the CRAB LOUSE (*phthirius pubis*), sometimes found in the eyebrows, but more frequently in the pubic region, and chiefly in persons of licentious habits; having the body broader, and other characters considerably different from the other two. The common or head louse is a very common parasite. The symptoms which the bites of these insects produce are a troublesome itching, and a more or less apparent eruption upon the scalp, the eruption being usually accompanied by small incrustations of blood produced by scratching off the epidermis. On examining the head, in addition to the insects, numerous eggs called *nits* are found, which are of a pyriform shape, and adhere firmly to the hairs. In six days the young escape from the egg; at the age of eighteen days these are again ready to lay eggs; and the female lays 50 eggs in all; so that the rapid augmentation of these insects is easily accounted for. When only a few lice are present, they may be removed by careful combing, or may be killed by the free application of oil or pomatum to the head; but when they are abundant, the scalp should be sprinkled with the Persian insect-powder (*pyrethrum caucaseum*), which, according to Küchenmeister,

soon kills them, or rubbed with white precipitate ointment, which is the most common remedy in this country.

The body louse causes most irritation on those parts of the skin which correspond with the folds and seams of the clothing about the neck and round the waist where the clothes are fastened to the body. The irritation is of the same character as that caused by the preceding species, and the treatment is similar. It is said that the clothes may be purified by burying them in hay for several weeks, but the safer plan is to destroy them. The irritation caused by the crab louse is greater than that caused by the other species. It may be destroyed by one or two applications of an essential oil (oil of rosemary for example), or of white precipitate ointment.

Whether the *pediculus tabescentium*, or louse occurring in the *lousy disease*, is or is not a distinct species, is still an open question. Indeed, the fabulous element enters so largely into most of the recorded cases of this disease—as, for example, when Amatus Lusitanus relates that two slaves were incessantly employed in conveying to the sea in baskets the lice which appeared on the body of their master—that the question is of comparatively little importance.

An interesting question has been raised with regard to the lice infesting human beings, it being alleged, by those who desire to establish the essential diversity of certain races, and particularly by Americans anxious to make out the widest possible difference between the European race and negroes, that the lice found on different races are specifically different. The subject has been examined with great care by Mr. Murray of Conland, and with evident impartiality; the result being, as appears from his paper in the *Transactions of the Royal Society of Edinburgh*, 1860–61, that the differences among these parasites are like those among the races of men themselves, easily observed, but not certainly specific.

LOUTH, a maritime co. of the province of Leinster, in Ireland, bounded n. by Armagh and by the lough of Carlingford, e. by the English channel, s. by the Boyne and the co. of Meath, and w. by Meath and Monaghan. Pop. '71, 84,021. Its area is 315 sq.m., or 202,523 acres. In this county 106,071 acres are under tillage, 69,322 pasture, 4,882 in plantations, 21,595 waste, bog, towns, etc., and 653 under water. There is an extensive tillage of wheat, barley, oats, and green crops. Linen also is largely manufactured. The surface is flat, with the exception of the lofty range on the n., which stretches e. and w., and terminates, at a height of 1935 ft., in Carlingford mountain, overlooking the bay of that name. This range consists of a granite nucleus, supporting limestone and clay-slate on its flanks. The soil of the level districts is extremely fertile, and eminently suited for wheat-crops. The chief rivers are the Boyne (its boundary on the s.), the Fane, the Glyde, and the Dundalk river. The chief towns are Drogheda, Dundalk, and Ardee. Louth anciently formed portion of the territory of Oriel or Or-gial, but was occupied by De Courcy, and formed into a county by king John in 1210. It was early apportioned among the military adventurers who accompanied De Courcy and De Lacy; but most of these original settlers have been displaced by later confiscations and apportionments of territory, especially after 1641 and 1690. It abounds with Celtic antiquities, some of which, in the neighborhood of Dundalk, are of great interest. The ecclesiastical antiquities are very striking. There are two round towers, at Monaster-boyce and at Dromiskin. At Mellifont are the remains of a beautiful abbey. In Drogheda several ruined abbeys are still visible, as also at Louth and Carlingford. But the most interesting of all the relics of antiquity in Louth are the celebrated sculptured crosses of Monaster-boyce, of which the larger is 18 ft. in height. The county of Louth returns two members to the imperial parliament. It is in the Belfast military district, except Drogheda, which is in the Dublin district.

LOUTH, a large market t. and municipal borough of England, in the co. of Lincoln, 25 m. e.n.e. of the city of that name, on the Ludd. It contains a recently erected mansion house, with a court-house and assembly-room; a beautiful parish church of the latter part of the 14th c., with a rich octangular spire 300 ft. in height; and a grammar-school, with an endowed annual income of £620 a year. Iron foundries, tanneries, oil-cake mills, and carpet factories are in operation. By means of the canal, extending between Louth and Tetney haven on the estuary of the Humber, considerable traffic in corn and coal is carried on. Pop. '71, 10,500.

LOUVAIN (Ger. *Löwen*, Flemish, *Leuven*), a city of Belgium, in the province of Brabant, on the Dyle, 16 m. e.n.e. of Brussels. It is of considerable extent, but great part of the ground is occupied with fields and gardens. Pop. '76, 33,917. It was at one time much larger. During the 14th c., when it was the capital of the duchy of Brabant, it contained 200,000 inhabitants, and 4,000 cloth manufactories. The citizens, however, endeavoring, in the latter part of the 14th c., to assert their independence, along with those of other towns of Flanders, were defeated; and many of the weavers from whose industry the city had in a great measure derived its wealth and importance, took refuge in England, and thus contributed not a little to the prosperity of that country. Louvain has never recovered from the blow which it then received. It is not now a place of much industry, but has very large breweries, some tobacco and lace manufactories, etc., and a European fame for bell-founding. The university, founded in 1426 by duke John of Brabant, was, in the 16th c., regarded as the greatest in Europe, particularly excelling

in the department of Roman Catholic theology. It had more than 6,000 students. It was suppressed for some time, in consequence of the French revolution, but restored by the Dutch government in 1817. The state relinquished it again in 1834, but the Roman Catholic clergy restored it at their own expense in 1835. It has a large library and a botanic garden, and is the most numerously attended of Belgian universities.

L'OUVERTURE. See TOUSSAINT, FRANÇOIS DOMINIQUE, *ante*.

LOUVET DE COUVRAY, JEAN BAPTISTE, 1760–97; b. Paris; son of a paper merchant; of moderate education. Before the revolution of 1789 he achieved a reputation by the publication of a licentious romance, the fashion of its time. He entered with ardor as a satirical writer into the politics of the revolution. His *Revue des Armées blanche et noir*, a satire on the nobles and clergy, has survived. That was followed by a romance, entitled *Emilie de Vermont*, as remarkable for its purity as his first work for the contrary. In 1790 he published a pamphlet entitled *Paris Justifié* in reply to strictures of the French *émigrés* on the excesses of the revolution. He then became a member of the Jacobin club, where he was conspicuous as an orator, and edited the journal of the Jacobins. He had the boldness to attack Robespierre in the club in 1792, and his name was striken from the list of members by that despot. He joined the Girondists in the convention, and his speeches at this stage of the revolution were remarkable for eloquence and daring defiance of the Jacobins. His apostrophe of accusation against Robespierre in the convention is considered the masterpiece of that exciting session. Mme. Roland classes it with the great efforts of Cicero. But the Robespierre party triumphed; Louvet was doomed to the guillotine, escaped, and hid in the mountains—tracked like a beast. After the fall of Robespierre he returned to the convention, was made president of the subsequent assembly, and member of the committee of public safety. The last year of his life was imbittered by the slanders of the party of reaction, and his own principles were modified by the desire to promote the speedy repose of France.

LOUVIERS, a t. of France, department of Eure, on the navigable river Eure, 60 m. n.w. of Paris. It has a cathedral, and celebrated cloth-manufactures, the annual value of which is between three and four million francs. Pop. '76, 10,097.

LOUVOIS, FRANÇOIS MICHEL LETELLIER, Marquis de, the war-minister of Louis XIV., was b. in Paris, Jan. 18, 1641. His father was chancellor and secretary of state in the war department, and purchased for him the reversion of this office. Louvois displayed great administrative ability; but his desire of power was insatiable, and he was willing to involve the whole world in the horrors of war, that he himself might be indispensable to the king. His war-policy was also ruthless. He caused the Palatinate to be wasted by fire and sword in 1674. For some time he was, after the king himself, the most powerful man in France. After the death of Colbert, financial affairs came under his control, and the system of extortion and borrowing which he pursued was among the causes of the revolution. He partially lost favor with the king by counseling him against the marriage with Mme. de Maintenon; but afterwards instigated the persecution of the Protestants, and involved France in the long war with the German empire, 1688–97. In 1689, with the alleged view of securing the confines of the kingdom, he again caused the Palatinate to be desolated. Mme. de Maintenon directed the attention of the king to these atrocities, who thereupon forbade the burning of Treves; but Louvois declared that, to save trouble to the king's conscience, he had already issued orders for reducing that city to ashes. The king, upon hearing this reply, seized the tongs from the chimney, and would have struck his minister with that ready weapon, if Mme. de Maintenon had not stepped between. Such scenes were repeated from time to time, and the health of the vain and ambitious minister gave way. He died suddenly, July 16, 1691. Louis is said to have rejoiced at his death.—An elaborate history of Louvois's administration, from original documents in the archives of the dépôt de la Guerre, by Camille Rousset, appeared in 1861–63 (4 vols., Paris).

LOUVRE (Fr. *l'ouvert*, the opening), an ornamental opening of a turret shape, placed on the roof, to allow the smoke or foul air to escape from large apartments, such as halls, kitchens, etc. These were particularly required in ancient times, when the fire was placed in the center of the room, and there was no chimney to carry off the smoke. They are frequently used as ornaments where not required for use, and are then glazed and made into lanterns (q.v.). The sides of the louvre were lined with horizontal overlapped boarding, with a space between the boards, which let out the smoke without admitting the rain. Hence, this sort of boarding, frequently used for the windows of bell-towers, etc., acquired the name of *louvre-boarding*.

LOUVRE, PALACE OF THE, the extensive buildings in Paris inclosing a quadrangular square at the e. end of the court of the palace of the Tuileries, and now connected with the latter. They are on the n. bank of the Seine, in the center of the city. The s. façade is on the quay of the Seine called *quai du Louvre*, the n. on the *rue Rivoli*, the e. on the *rue du Louvre* facing the old church of *St. Germain les Auxerrois*, and the w. facing the magnificent, recently built façades of the palace of the Tuileries. The site is supposed to have been originally a hunting rendezvous and king's castle. History does not reach back of the time when it was used as a royal habitation. A "new tower"

was erected in the center of the court in 1204, and used as an arsenal and prison. Francis I. took it down in 1527 because it was unsightly and darkened the courtyard; Charles V. had previously made some additions, among them a library room with 959 vols., the germ of the present bibliothèque nationale, with its 3,300,000 volumes. When Francis I. entertained Charles V. in 1539, he endeavored to disguise the bad condition of the old palace inside and out by temporary walls, repairs, and furniture; but was so dissatisfied with the result that he decided on its entire reconstruction on a new plan. The old Gothic edifices in the midst of fortified towers and prison walls were razed, and the present design of the quadrangular inclosure was adopted. The old court inclosed about 400 ft. square, and the inclosing palaces have 4 outer façades, 538 ft. and 576 ft. long, respectively. The w. side was built after designs by Pierre Lescot, mostly in the reign of Francis I. Henry II. commenced and Henry IV. finished the long gallery w. of the s.w. corner of the original quadrangle, with its main façade on the Seine. This is not properly a part of the Louvre, but a connecting link between the old and distinct palatial groups of the Louvre and the Tuileries. Being first connected with the Louvre, it has taken its name. It was completed in 1608, and is still one of the most ornate buildings in France. The sculptures of Jean Gougon in the friezes of the façade upon the Seine are the most exquisite examples of architectural sculpture in existence. Louis XIII. about 1624 had the w. side of the quadrangle completed. Under Louis XIV. the s. side was first completed; and then, by order of Colbert, architects were requested to send in designs for the e. side. The most beautiful design proved to be that of a physician, an amateur architect, Claude Perrault. Fortunately, its beauty secured its adoption, and that façade is now one of the classic models of the world. The e. façade was begun in 1665 and finished in 1670, and is known as the colonnade of the Louvre. It is 555 ft. long and 90 ft. high. But the edifice, of which it was only the façade, was not finished at that time. Louis XIV. concentrated all his extravagance on Versailles, and for many years this most noble portion of the Louvre was roofless, and going to destruction. Its basement story was used for stables, and its upper portions were temporarily covered to make rooms for artists and employees of the court. "It was a grand free hotel, where each one made his bed in his own fashion, and looked out for himself." In 1754 the e. colonnade and the façade now fronting the *rue Rivoli* were encumbered with temporary constructions that almost shut them from view. Louis XV. was induced to order their demolition, and to finish the designs that Perrault had conceived. But it was not done when the revolution of 1789 opened. The entire place on the e. and n. was still almost hidden behind the crowd of houses built against and in the midst of the unfinished palace buildings. Hills of rubbish encumbered the court. This remained the condition of this noble building until the last years of the first republic, when the work of clearing away the parasites was begun. When Napoleon's victories in Italy gave him the spoils of its works of art in the beginning of the present century, he ordered the restoration and completion of the buildings, and made them the repositories of the art works of France. The façade facing the court to the w. was remodeled and finished in his reign. He also contemplated the work, subsequently done by Napoleon III., of connecting the Tuileries with the Louvre by a continuous line of palaces on the n. and s. sides. Fortunately, he executed but a small part of the project, and that after designs so inferior to other parts that they still stand between exquisite examples of architectural art on each side, which preceded and succeeded them, as marplots in the midst of that aggregation of beautiful palaces. The government of Louis XVIII. and Charles X. continued the work of finishing the interior of the Louvre. In the reign of Louis Philippe the plan of connecting the Louvre with the Tuileries was agitated. M. Thiers demanded 100,000,000 francs for this and a mass of other work which he desired to have undertaken. Fourteen millions was the sum named for the completion of the Louvre and the Tuileries. It was refused. Louis Philippe gave the project little support. When he was deposed in 1848, the provisional or republican government at once began the great work. Thiers and gen. Cavaignac secured the passage of a law which authorized the work subsequently pushed to completion by Napoleon III. The plan, by M. Visconti, was the same which, with slight modifications, has been made to redound almost exclusively to the credit of the emperor; though fully conceived and entered on before he was in the government. Yet it must be conceded that it is doubtful if such magnificent additions could have gone forward to completion under a government more popular and liable to more frequent changes in legislation. In connection with the grand avenues which he projected and completed, this work of connecting the Tuileries and the Louvre is the most splendid monument of expenditure in ornamental construction of modern times. The cost has probably been not less than $15,000,000. It was fairly underway in 1854, and completed in 1859. The palaces of the Louvre and the Tuileries combined, with their inclosed courts, cover about 60 acres.

The museums and galleries of the Louvre, now the most extensive and the choicest collection of art works in the world, have acquired nearly all their greatness within our own century. The nucleus was made by the taste and liberality of Francis I., who not only appreciated, but gathered the artists and art works of all countries around him. But their works were mostly assembled at the palace of Fontainebleau. Colbert, in the reign of Louis XIV., made immense additions; all of which, remarks a writer of that time, were imprisoned by the royal *roué* in the palaces of Versailles, but "ought to be ranged

in beautiful order in the great halls of the Louvre, where they might be exposed to the admiration and joy of the French and the curiosity of strangers, and become a source of study and emulation to a French school of art." It has taken two centuries to effect the accomplishment of that wise advice. Before the time of Louis XVI. the galleries of the Louvre had become the principal museum of valuables, both of mechanical and art works: and the seat of the royal academies of sciences, belles-lettres, architecture, painting, and sculpture. In 1775 it was proposed to gather all the masterpieces of art belonging to the kings in the long gallery, but it was at Versailles, instead, that they continued to accumulate. The republic of 1791 broke up this royal selfishness. The immense art resources of France were brought out of the royal catacombs, collected, systematized, and exposed to public view in the great halls of the Louvre. It was during the fermentation and the horrors of the great revolution of 1791 that the present national museum was ordained, and a commission appointed by the legislative assembly to collect all works of greatest value and beauty from the royal galleries and transport them to the Louvre, to form the museum of the republic. At a moment when France was almost crushed by a foreign coalition and in the heat of internal turbulence, Roland, then minister of the interior (1792), was instructed to plan the organization of that vast museum. The *muséum Français*, afterward called *musée central des arts*, was opened in 1793. But it was a heterogeneous mass until many years after. In 1798 it was enriched by the pillages of Napoleon I. in Italy. Since that time each new government of France has been ambitious to enlarge and perfect all departments of its museums. There never have existed museums comparable in extent or perfectness of arrangement to those of the Louvre at the present time.

LOV'AGE, *Ligusticum*, a genus of plants of the natural order *umbelliferæ*, allied to *angelica*, the fruit elliptical, each carpel with five sharp somewhat winged ribs, and many vittæ in the interstices. COMMON LOVAGE (*L. officinale*, or *L. levisticum*) is a native of the s. of Europe, with ternate decompound leaves, and obovate-wedge-shaped leaflets. It is sometimes cultivated in gardens, and notwithstanding its strong and peculiar odor, is used as a salad plant. Its roots and seeds are aromatic, acrid, and stimulant, and are used to cure flatulency and to excite perspiration. A liquor called *lovage* is made from them. Very similar in appearance and qualities is the only British species, SCOTTISH LOVAGE (*L. Scoticum*), a native of the sea-coasts in the northern parts of Britain. It is eaten, both raw and boiled, by the Shetlanders. The flavor is aromatic, but acrid, and very nauseous to many who are unaccustomed to it.

LOVAT', a river of Russia, rises in the Witebsk marshes, and flows through the governments of Pskov and Novgorod into lake Ilmen. Its total length is 267 m., and it is navigable for barges of 50 tons as far up as Kholm, more than 80 m. from its mouth.

LOVAT, SIMON FRASER, Lord, was b. about the year 1676, and was the second son of Thomas Fraser, fourth son of Hugh, ninth lord Lovat. His mother was Sybilla, daughter of the chief of the Macleods. The Frasers, a family of Norman origin, had obtained Highland territories, in the county of Inverness, in the 13th c., and had established themselves as the patriarchal chiefs of the Celtic inhabitants within these territories, rather than as landlords, in the feudal acceptation of the term. The first settler—or, more probably, the first who gained renown—was named Simon, and hence his descendants were called sons of Simon, or M'Shime. The descendant here commemorated had little hope of succeeding to the estates and honors, until the prospect opened to him under a settlement by his cousin lord Lovat. The succession was not indisputable, but until a much later period in the Highlands, influence with the clan often superseded direct hereditary descent. Simon at an early period gained their hearts. His first adventure was an effort to get forcible possession of the young sister of the late lord, who had more legal claims, as heiress to the Fraser estates. Baffled in this, he, for a reason which has defied all attempts to discover, seized on the widow of the late lord, a lady of the Athole family, and compelled her to marry him. As this was not only a crime, but an offense to a powerful family, Simon could only protect himself from punishment by force, and thus he kept up a petty rebellion for some years. On the accession of queen Anne, when his opponents became all-powerful, he fled to the continent. He was at the bottom of the affair called the Queensberry plot in 1703, in which he professed to reveal the policy of the exiled court, and a plan for a rising in their favor among the Highlanders. On the discovery that he had hoaxed Queensberry and other statesmen, and was playing a deep game of his own, he escaped with difficulty to France. Of the method of his existence there during twelve years, there are only mysterious rumors, by one of which he was reputed to have taken orders as a Romish priest. He had been outlawed for his outrages, and another enjoyed his estates by the letter of the law; but he was still the darling of his clan, and on the breaking out of the insurrection of 1715, they sent a sort of ambassador to bring him over. What followed is remarkable, as showing that the Highlanders were led by the politics of their chiefs, not by their own prepossessions. The holder of the estates having joined the insurrection, Simon found it his interest to take the government side. His clan at once left the insurgents; and for this good service he was invested with the estates, not only by the votes of his clan, but by the law. His life, for the ensuing 30 years, was active with local intrigues calculated to strengthen his influence. In the insurrection of 1745, he tried to play a double game,

sending forth his clan, under the command of his son, to fight for the pretender, and deeply plotting for that cause, while he professed to be a loyal subject. He was a special object of the vengeance of the government, and after a trial by his peers, was beheaded on April 9, 1747. He was remarkable as a type of that class of Highland chiefs who professed to be led by policy as sovereigns, rather than by the laws of the country or its social system, and who were ashamed of no turpitude, fraud, or violence, if it tended to the aggrandizement of themselves and their clans.

LOVE-APPLE. See TOMATO.

LOVE-BIRD, *Psittacula,* a genus of birds of the parrot family (*psittacidæ*), a group of beautiful and very small species, natives of the warm parts of America, of Africa, and Australia. They receive their name from the affection which they manifest towards one another, whether in a wild state or in a cage. An Australian species, about the size of a sparrow, is now common as a cage-bird in Britain. They are lively birds, and fond of being caressed. They feed on the seeds, etc., on which canaries are fed, and are very fond of chick-weed and other plants, with seeds ripe or nearly so. Anatomically, this genus is remarkable in the parrot tribe for having no *furcula* (merry-thought bone).

LOVE-FEASTS (AGAPÆ, *ante*), are now celebrated, 1. by the Moravians, in strict accordance with the primitive custom and on various occasions, generally in connection with a solemn festival, or preparatory to the communion. Hymns are often used that have been composed and printed expressly for the occasion. In the course of the meeting, a simple meal of biscuit and coffee, or tea, is served, of which the congregation partake together. In some churches the minister makes an address at the close. 2. Wesley introduced the observance among the Methodists, appointing one evening in each quarter for the men, another for the women, and a third for both together. The food is only plain cake and water. Only members of the church attend, and admission is secured by tickets. The same rule is nominally established in the Methodist-Episcopal church, but is not strictly enforced, members of the congregation also being admitted. The feast is celebrated at the quarterly conference, under the charge of the presiding elder, or, in his absence, of the pastor of the church. The service begins with reading the Scriptures, singing, and prayer. During the distribution of bread and water, of which all partake, persons so disposed relate their Christian experience. A report concerning the prosperity of the church is made by the pastor, and the names are read of those who have been received, excluded, or dismissed by certificate, of those who have died, and of those who have irregularly withdrawn. 3. Love-feasts after the primitive order are held in some, at least, of the Baptist missionary churches. At Berlin, Prussia, where they are held quarterly, they serve as an occasion for general social assembling in which coffee and cake take the place of bread and water.

LOVEJOY, ELIJAH PARISH, 1802–37; b. in Albion, Me.; graduated at Waterville college in 1826; went to St. Louis, Mo., where he was engaged first as a teacher, then as a political editor; studied theology at Princeton, and in 1833 was ordained a Presbyterian minister; returned to St. Louis and became editor of the *Observer*, a religious journal. Antislavery agitation was then rife throughout the free states, and Mr. Lovejoy, while disclaiming any connection with the abolitionists, was yet imbued with the old-time New England hostility to slavery and with an earnest zeal for the freedom of the press. Occasional paragraphs in the *Observer*, evincing a firm but moderate opposition to slavery, gave great offense to the people of St. Louis. Censured and menaced for this exercise of the freedom of speech in a slave-holding community, he reminded his censors that the blood in his veins was kindred to that which flowed at Lexington and Bunker Hill, and declared that he could not consent to wear a chain. In the spring of 1836, a negro criminal was taken out of the St. Louis jail by a mob, chained to a tree, and burned to death. An attempt being made to indict the authors of the crime, judge Lawless, in his charge to the grand jury, laid down the doctrine that when a mob is hurried by some "mysterious, metaphysical, and almost electric frenzy," to commit a deed of violence and blood, the participators therein are absolved from guilt, and therefore not proper subjects of punishment. If the jury should find that such was the fact in the case before them, then, said the judge, "act not at all in the matter; the case transcends your jurisdiction; it is beyond the reach of human law." Mr. Lovejoy's comments upon the charge of judge Lawless aroused deep indignation in St. Louis, in consequence of which the office of the *Observer* was destroyed by a mob. He thereupon determined to remove his paper to Alton, Ill., but his press on being landed there was broken into fragments by lawless men. The citizens of Alton reimbursed him for his loss, and another press was procured. In Aug., 1837, the office was invaded by a mob and the press and types destroyed. Another press was brought to the place, but before it could be set up it was broken in pieces and the fragments thrown into the Mississippi. A strong body of law-abiding citizens, who felt that it would not be right to submit to the dictation of a mob, rallied around Mr. Lovejoy and offered to procure for him still another press. A convention, embracing men of the highest character from different parts of Illinois, met at Upper Alton and resolved that "the cause of human rights, the liberty of speech and of the press, imperatively demand that the press of the *Observer* be re-established at Alton with its present editor." The pro-slavery party were

equally determined that the paper should be suppressed. At this critical juncture a public meeting was called in Alton to consider whether the publication of the *Observer* there should be any longer permitted. At this meeting Mr. Lovejoy appeared and made an address. "I am impelled," he said, "to the course I have taken because I fear God. As I shall answer to him in the great day, I dare not abandon my sentiments, or cease in all proper ways to propagate them. I am fully aware of all the sacrifice I make in here pledging myself to continue the contest to the last. I am commanded to forsake father and mother, wife and children, for Jesus's sake; and as his professed disciple, I stand pledged to do it. The time for fulfilling this pledge in my case, it seems to me, has come. Sir, I dare not flee away from Alton. Should I attempt it, I should feel that the angel of the Lord, with drawn sword, was pursuing me wherever I went. It is because I fear God that I am not afraid of all those who oppose me in this city. The contest has come here, and here it must be finished. Before God and you all I have pledged myself to continue it, if need be, till death; and if I fall, my grave shall be made in Alton." This address had a powerful effect even upon some of his opponents, and for a time it was hoped that the mob could not be rallied for the commission of further violence; but when it became known that another press had arrived, an intense excitement followed. The mob was warned of the event by the blowing of horns. The mayor superintended the transfer of the press to a warehouse, and aided in storing it away. Friends of liberty and order volunteered to watch and defend it. Mr. Lovejoy could not consent that his friends should incur, for his sake, dangers not shared by himself, and therefore he joined the party of defense. On the evening of Nov. 7, 1837, the watchers armed themselves and entered the warehouse where the press was stored, resolved to defend it, if necessary, with their lives. No attack having been made at 9 o'clock, most of the defenders retired to their homes, leaving but a dozen or so, among whom was Mr. Lovejoy himself, on guard. Near midnight a mob of 30 or 40 men issued from the drinking-shops in the vicinity prepared for deeds of violence and blood. They threw stones at the warehouse, smashed the windows, and fired several shots; and then they set up the cry, "Burn them out." Preparations were making to fire the building, when the mayor, who had pursued a wavering course from the beginning, came to the spot, and consented to bear a message from the mob to Mr. Lovejoy and his friends, to the effect that if they would surrender the press they should not themselves be injured. These terms were rejected, and then went up the cry, "Fire the building, and shoot every abolitionist as he leaves." The roof being set on fire, five of the defenders rushed out, fired upon the mob, and returned. Mr. Lovejoy and two others next stepped out, and were fired upon by rioters concealed behind a pile of lumber. One of the shots was fatal to Mr. Lovejoy, who lived only long enough to return to the counting-room, where, after exclaiming, "I am shot," he fell down and expired. The event caused great excitement throughout the country, some defending, others excusing, and many more denouncing Mr. Lovejoy. William Ellery Channing was foremost among those who held that he was entitled to the honors of a martyr to the freedom of speech and of the press; but there were men high in influence and public station who did not hesitate to declare that he had "died as the fool dieth." The grave of Mr. Lovejoy, which was made upon a bluff overlooking the Mississippi, was unmarked for many years, but a monument, with an appropriate inscription, now stands above it, reminding those who visit it of the sacrifices which it has cost to maintain in this republic the freedom of the press.

LOVEJOY, OWEN, 1811–64; brother of Elijah P.; b. in Albion, Me.; educated at Bowdoin college, and removed to Alton, Ill., where, after witnessing the martyrdom of his brother, he knelt upon his grave and vowed eternal war against slavery. A man of powerful physique, intense feeling, and great magnetism as a speaker, he preached and lectured against slavery with a passionate energy that carried the people with him. In 1838 he became pastor of a Congregational church in Princeton, Ill., where he distinguished himself by the boldness of his attacks upon slavery from the pulpit. In 1856 he was elected to congress, where he took a leading part in the conflicts that preceded the rebellion. Repeated attempts were made to intimidate and silence him, and he was denounced as one who, in assisting slaves to escape, violated the constitution which he had sworn to support. More than once he was in danger of assassination. His reply to these denunciations was to proclaim that he had aided and would aid every fugitive slave that came to him for help. Died, Brooklyn.

LOVELACE, RICHARD, 1618–58; b. England, educated at Charterhouse school and Oxford. For presenting to the "long" parliament a petition from his native county, in favor of Charles I., he was imprisoned, and released only on giving bail in the sum of £40,000. In 1646 he commanded a regiment in the French army before Dunkirk, where he was dangerously wounded; and it is said that Lucy Sacheverel, the "Lucasta" of his poems, upon a false report of his death married another person. On his return to England in 1648, he was again imprisoned and did not regain his liberty till after the king's death. He had spent his fortune in the king's service; and from being, as Anthony-a-Wood says, "the most beautiful person eye ever beheld," "became very poor in body and purse." He had published, in 1649, *Lucasta, Odes, etc.*, containing many

spirited lyrics, and he was also the author of a comedy called *The Scholar*, and a tragedy, *The Soldier*, which have not been preserved.

LOVELL, JAMES, 1737–1814; b. Boston; graduated at Harvard in 1756; was usher of the Boston Latin school under his father, John. When the people of Boston, April 2, 1771, celebrated the first anniversary of the British massacre in that city, Mr. Lovell was the chosen orator of the occasion. After the battle of Bunker Hill he was imprisoned by gen. Gage, but exchanged in 1776. From 1776–82 he was a member of the continental congress; from 1784–88 receiver of taxes; in 1788–89 collector of the port of Boston; from 1790–14 naval officer. He was also for a time master of the North grammar school in Boston. Died in Windham, Me.

LOVELL, JAMES, 1758–1850; graduated at Harvard in 1776; was adjutant in Jackson's Massachusetts regiment, 1776–79, and of Lee's "legion" in the southern campaign. He took an honorable part in many of the battles of the revolution. Died at St. Matthews, S. C.

LOVELL, JOHN, 1710–88; b. Boston; graduated at Harvard in 1728; was appointed usher of the Boston Latin school 1729, and master in 1734; held the latter position until 1775, when the school was suspended by the siege of Boston. He was familiarly called "master Lovell" during this long period, and among his pupils were many of those who became prominent in the revolution. He was an accomplished classical scholar, and, though a rigid disciplinarian, highly popular as a teacher. At the dedication of Faneuil hall in 1743 he was the chosen orator. He was, however, a loyalist, and left Boston for Halifax with the British troops in 1776. Died at Halifax. His portrait is in the gallery of pictures at Harvard college.

LOVER, SAMUEL, artist, novelist, song-writer, and composer, was the son of a stockbroker in Dublin, and was born in that city in 1797. At an early age he showed a great desire to become an artist, and with genius and perseverance, succeeded so far that, in 1828, he was elected a member of the royal Hibernian society of arts. In 1833 he exhibited at the royal academy a portrait of Paganini, which is said to have brought him some reputation as a portrait-painter. As a miniature-painter, in Dublin, he took likenesses of the principal aristocracy and leaders of Irish society. But while thus engaged, he discovered that he possessed a genius for authorship as well as for art, and was encouraged to make some attempts in that direction by the favorable opinion of Thomas Moore. In 1832 he published a collection of short pieces, entitled *Legends and Stories of Ireland, by Samuel Lover, R.H.A., with six Etchings by the Author* (12mo, Dublin), which was favorably received, and followed by a second series, published in London in 1834. In 1837 Mr. Lover settled in London, and having made authorship his profession, contributed largely to the periodical literature of the day. He also wrote *Rory O'More*, a romance of Irish life, which immediately became popular. Its production on the stage, with the excellent acting of Power in the principal character, made the author still more known. His next publication was *Handy Andy*, commenced, but not completed, in *Bentley's Miscellany;* the entire work, with illustrations by the author, appearing in 1842. In 1844 Mr. Lover published *Treasure Trove, the first of a series of Accounts of Irish Heirs, etc.; with twenty-six Illustrations on Steel by the Author*. This was originally published in numbers, under the title of *L. S. D., or Accounts of Irish Heirs*, etc. As a writer of songs Mr. Lover holds a well-earned reputation; his *Rory O'More*, *Molly Bawn*, *Low-backed Car*, *Molly Carew*, and others, have long been established favorites with the public. In 1839 Mr. Lover published a collection of his *Songs and Ballads*, with the words only; but considerably more than 100 of his songs have been separately published with music, composed or adapted by the author himself. In 1844 Mr. Lover projected an entertainment called "Irish evenings," which was very popular both in London and the provinces. Its success encouraged him to visit the United States, where his entertainment was also well received. He returned from America in 1848, when he made his experiences there the material for a new entertainment, which he gave in London. Mr. Lover was for some years in the receipt of a pension from the crown, in recognition of his literary merits. Besides the works already mentioned, and his numerous songs, Mr. Lover was author of *Metrical Tales, and other Poems*, published in 1860. He was also the editor of a well-selected compilation of songs and ballads by various authors, entitled *The Lyrics of Ireland*, published in 1858. He died July 6, 1868.

LOVEWELL, JOHN, b. N. H. near the close of the 17th c.; d. 1725; son of John, an ensign in the army of Cromwell, who is said to have lived to the age of 120 years. In 1724–25 he was engaged as a captain of volunteers in several successful military expeditions against the Indians, but was killed in the latter year at the head of his company in an engagement with a body of Indians led by the chief Paugus. "Lovewell's pond," in New Hampshire, derived its name from the hero of that fight. The battle has been commemorated in a poem by Enoch Lincoln, a member of congress from Maine, delivered at the celebration of its centennial anniversary in 1825, and also in *The Expedition of Captain Lovewell*, by F. Kidder, published in 1865.

LO'VICZ, an ancient t. of Poland, on the Bzura, a tributary of the Vistula, in the government and 45 m. w.s.w. of Warsaw, is mentioned in history as early as 1136. About 1355 it became a favorite residence of the primates of Poland. It has taken a

prominent part in the political revolutions of the country. Pop. '67, 6,136. Six fairs are held here annually.

LOW, ABIEL A., b. Salem, Mass., 1811; received a common-school education, and at an early age turned his attention to commercial pursuits. Taking up his residence in New York, he soon became a successful and prominent merchant. He has long been a member, and at different times president, of the chamber of commerce. He is still in business in New York, having his residence now, as for many years, in Brooklyn, and is greatly esteemed as a public-spirited citizen, munificent in his contributions to various objects of public prosperity and to institutions of charity.

LOW, FREDERICK F., b. Frankfort, Me., 1828; went to California in 1849, and after being engaged for a time in mining operations, became a merchant in San Francisco, then a banker at Marysville; was a republican member of Congress 1861–63, collector of the port of San Francisco 1863–64, governor of the state 1864–68, and minister to China 1869–72.

LOW ARCHIPELAGO, or PAUMOTA ISLANDS, a very extensive group of small coral islands, lying to the eastward of the Society islands, and southward from the Marquesas islands. This group or archipelago extends from 15° to 25° s. lat. and from 134° to 148° w. long. The navigation of this part of the ocean is, as may readily be supposed, dangerous. Some of the islands are in minor groups, others are quite solitary. The whole pop. is estimated at about 10,000.

LOW COUNTRIES. See NETHERLANDS, *ante*.

LOWE, Sir HUDSON, was b. at Galway, July 28, 1769. His childhood was spent in the West Indies, where his father held a military appointment. Lowe returned to England when in his twelfth year. Having entered the army, he served for some time in Corsica, subsequently at Lisbon and in Minorca. On the renewal of the French war, after the peace of Amiens, he was appointed to the chief military command in the island of Capri. He was here unsuccessful, being obliged to surrender to the French, Oct. 16, 1808. He served for some time in the n. of Europe, and in Germany under Blücher. On Aug. 23, 1815, he was appointed governor of St. Helena, with the rank of lieut.gen. Previous to leaving England he married, in Jan., 1816, Susan, widow of col. William Johnson. He arrived in St. Helena on April 14, 1816, Napoleon having been landed there on Oct. 17, of the previous year. It is impossible to conceive a situation in which the adequate discharge of a public duty more surely involved a heavy amount of private care and public obloquy than that which had fallen to Lowe. Had he for a single hour relaxed the necessary vigilance, his own impeachment and another European war might have been the consequence. On the other hand, the due exercise of this vigilance entailed upon him every kind of annoyance which the peevish and irritable captive had it in his power to give. Even were it true that he exercised a needless severity in guarding Napoleon, this might readily be excused when we consider how often it must have been utterly impossible for him to know what was unnecessary and what was not, and of how little consequence was the convenience of one man, who had already broken his parole, compared with the security of the whole world. On the death of Bonaparte Lowe returned to England, where his eminent services met with a very ungrateful return. In 1825 he was appointed military commander in Ceylon, from whence he returned to England in order to refute the charges brought against him by O'Meara and others. He died at London in very poor circumstances, in the 65th year of his age, Jan. 10, 1843.

LOWE, Right Hon. ROBERT, English politician, b. 1811, at the rectory of Bingham, Notts, of which parish his father, the rev. Robert Lowe, was rector. He was educated at Winchester, and University college, Oxford, where he was first-class in classics, and second-class in mathematics, 1833. He remained at Oxford, was elected fellow of Magdalen in 1835, devoted himself to tuition, and obtained the reputation of being one of the best private tutors in the university. In 1836 he married, and gave up his fellowship. He was called to the bar by the honorable society of Lincoln's Inn, in 1842, and went to Australia to push his fortune. He soon attained a lucrative practice at the Sydney bar. He also took a leading part in the political struggles of the colony. In 1843 he was nominated one of the legislative council. In 1848 he was elected member for Sydney. Some successful land speculations put him in possession of a moderate competency; and he returned to England, in 1850, with the design of entering upon a parliamentary career. Returned in 1852 for Kidderminster as an independent member with conservative tendencies, he, in 1853, took office under lord Aberdeen, as secretary to the board of control. He went out with lord Aberdeen's government, but in Aug., 1855, he accepted from lord Palmerston the post of vice-president of the board of trade. At the general election in Mar., 1857, he was invited to offer himself for Manchester, but he preferred to remain at Kidderminster. Here, however, he became unpopular with the working-classes. He gained his seat, but not without an election riot, in which he was severely injured. In 1859 he exchanged this turbulent constituency for the borough of Calne, where the influence of the marquis of Lansdowne procured his return. He sat for Calne till 1868, when, at the general election, he was returned for the London university, which he still (1879) represents. In June, 1859, he became virtual minister for

education in lord Palmerston's second administration; and he held this office until April, 1864, when the house of commons, on the motion of lord Salisbury, then lord R. Cecil, having condemned an alleged practice of the privy council office in tampering with the reports of the education inspectors, Lowe, unnecessarily, as it was thought, resigned office. The introduction of the revised code of 1860, with its principle of "payment by results," signalized his administration of the education department. Time has shown that this was a valuable reform, but it brought upon him much obloquy, which his personal characteristics by no means tended to avert or mitigate. His emancipation from the restraints of office exhibited Mr. Lowe in a new phase. No speaker, during the session of 1865, was so logical, so original, and so daring. In 1866, on the introduction of the whig reform bill, Lowe delivered the first of a series of powerful speeches, which largely contributed to insure its rejection. He was, with other members of what was called the party of "adullamites," offered a post in the Derby government, but he declined to leave the liberal party, though describing himself as an outcast from it. When the Derby government, in 1867, attempted to deal with the reform question, Lowe, in a series of speeches, vindicated his consistency as an opponent of all reduction of the suffrage. Circumstances had, however, changed, and the successful opponent of the comparatively moderate whig measure found himself almost alone in protesting against the establishment of household suffrage. In 1868 Lowe's feud with the liberal party was made up, or rather, was forgotten, in the strenuous aid he gave the liberal leaders in carrying resolutions in the house of commons for the disestablishment of the Irish church. Accordingly, in Dec. of that year, when a general election brought the liberal party into power, with Mr. Gladstone as prime-minister, Mr. Lowe obtained in the liberal ministry the office of chancellor of the exchequer. This post he filled till Sept., 1873, when he exchanged it for that of home secretary. He went out of office with the Gladstone government in Feb., 1874, when it became plain that the chances of a general election had given the conservatives a majority. He was home secretary for too short a period to test his fitness for that trying office. As chancellor of the exchequer, he was not deemed decidedly successful. The chief reforms effected by him during his tenure of office, were the substitution of license duties for the assessed taxes, a change in the time of collecting the income-tax, and in the assessment of that tax on small incomes, and a great reduction of the sugar duties. He did himself much harm with his first budget by proposing a tax on matches—a proposal easily put in ludicrous lights and which excited strong opposition. During his occupancy of this office, however, the annual surpluses were large almost beyond example. This was due partly to economical management, but much more to the prosperous state of the country. Lowe exerted himself earnestly to keep down the public expenditure. It was considered, however, that his regard for the public purse was pushed to the verge of parsimony, and of injustice to individuals; and his curt and ungracious treatment of all claimants of public money undoubtedly brought much odium upon himself and the government to which he belonged. Some faults of administration came to light in the later days of his administration, which were naturally made the most of. Lowe's oratory is deficient in passion; but in acuteness, in felicity of illustration, and in cogency of argument, he is almost unequaled among the public speakers of his day. His elocution is rapid, and his manner nervous and embarrassed; but his great intellectual power always commands the attention and admiration of the house of commons. Several collections of speeches and letters by him on public questions have appeared. As an educational reformer, he is an energetic opponent of the pre-eminence still allowed to the study of the classics. Lowe was made an honorary LL.D. by Edinburgh university in 1867, and D.C.L. by Oxford in 1870.

LÖWE, SOPHIE; 1815–66; a German singer who appeared in opera in Vienna in 1832, and made a great sensation, both by her superb voice and her showy beauty. She married prince Frederick of Lichtenstein in 1848, and retired from the stage.

LOW'ELL, a city of Massachusetts, on the Merrimac river, 25 m. n.w. of Boston. Here the Pawtucket falls, of 30 ft., afford water-power for the factories which have given to this town the name of the "Manchester of America." The canal is owned by a company, which erected extensive machine-shops, and has built the factories for 11 "corporations," manufacturing cotton goods, prints, woolens, carpets, etc., consuming 40,000,000 lbs. of cotton per annum. Lowell was incorporated in 1826. The operatives were for years gathered from the rural districts 50 or 100 m. around, and lived in boarding-houses built and owned by the corporations, and kept under strict management. Foreign emigration has brought a large resident manufacturiug population. Lowell has several banks, daily and weekly newspapers, literary institutions, about 30 churches, and extensive educational establishments. Pop. in '60, 36,827; in '70, 40,928.

LOWELL (*ante*), a city in n.e. Massachusetts, the terminus of the Boston and Lowell, the Nashua and Lowell, the Stony Brook, Lowell and Andover, and the Framingham and Lowell railroads; 2,587 acres; pop. '80, 59,485. It is one of the largest manufacturing cities in the United States, its industries having been the foundation and subsequent basis of its prosperity. Its natural advantages and facilities for the economical outlay of capital are unsurpassed, and the use made of them is unexampled. The Merrimac river,

near the mouth of the Concord river, furnishes its water-power, and affords a charming addition to the landscape as viewed from Belvidere, in the e. portion of the city, a quarter occupied by the wealthiest residents. Along the wide avenue leading from this suburb a view may be obtained of the broad, winding river, the great compactly built factories, like grim stone palaces, their windows refracting the sun's rays with a metallic luster or revealing the gaslight through myriads of starry panes, the busy toiling city below, and the White mountains gleaming through miles of misty distance, with Mt. Wachusett and the Monadnock in grand relief. It received its city charter in 1836, and is governed by a mayor, a board of aldermen of 8 members, and a common council of 24. It originally comprised the town of East Chelmsford, receiving subsequently parts of Dracut and Tewksbury. It is well paved, well drained, and well lighted with gas. It has a fine city hall, other public halls of convenient size, a city library of 17,000 volumes, a mechanics' library of 13,000, a court-house, 7 national banks with an aggregate capital of $2,350,000, 6 savings banks, 2 hospitals, 2 insurance companies, a Roman Catholic orphan asylum, an old ladies' home, a young women's home, a good fire department with an electric fire alarm, a well organized police force, and a horse railroad. It was named in honor of Francis C. Lowell of Boston. Its water-works, finished in 1873 and costing $1,500,000, supply it with pure water. The river at this point has a fall of 33 ft., and the water-power is owned by a company chartered in 1792, called the *Proprietors of the Locks and Canals on Merrimac River*, which purchased the canal privilege in 1821, adding to it and constructing another canal in 1847, the first cotton mill being erected in 1822. This company lease at the present time water-power equal to 10,000 horse-power for purposes of manufacture. Its water-power on the Concord river, leased by the Wamesit company is equal to 500 horse-power. The entire capital involved in its manufactures, and controlled by 12 companies, is estimated at $16,000,000, employing 16,000 operatives, of which 10,000 are females, producing 2,660,000 yds. of cotton weekly, of woolen cloth 60,000, carpeting 37,500. Number of shawls weekly, 2,500; dozens hosiery weekly, 16,800; lbs. of cotton consumed, 780,000; of clean wool, 152,500; yds. dyed and printed annually, 64,951,200. It has 80 mills, and over 678,521 spindles, looms 15,189, governed by 9 corporations, making use of 50 steam engines, of 6,188 horse-power in addition to the water-power. Among the largest corporations is the Merrimac manufacturing company having 5 mills and print works, running 158,464 spindles and 3,945 looms, employing 1800 females and 900 males. The consumption of cotton is 148,000 lbs. per week, making 830,000 yds. per week, and dyeing and printing 900,000 yds. Forty engines, equal to 3,800 horse-power, are used, and 6 turbine wheels to carry the water-power. Other corporations are the Lowell manufacturing company, the Tremont and Suffolk mills, the Lawrence manufacturing company, and the Massachusetts cotton mills; the smallest capital employed being $1,200,000, and the largest $2,500,000. They produce prints, drillings, cotton sheetings and shirtings, carpets (made by the Lowell manufacturing company), ingrain, Brussels, and Wilton, as beautiful and as durable as the best French and English make. They employ 1700 hands, 600 females in 1 spinning mill, 3 carpet mills, and 1 fine worsted mill; consuming 70,000 lbs. of wool and making 48,000 yds. of carpet per week, the machinery being run by a 450 horse-power Corliss engine. The buildings and property connected with these mills cover 10 acres. Other manufactures are serges, cassimeres, and beavers. The Lawrence company has 550 knitting machines, producing 12,000 doz. of cotton and merino hosiery weekly. The Appleton company added a new mill in '74. Each company owns the large boarding-houses, which are exhibited to the tourist as models, being built for the exclusive use of the operatives. They have also a hospital, where the sick operatives receive free attendance, if unable to pay. There are manufactories of edge tools, files, screws, machinery, boilers, fixed ammunition and cartridges, paper, hair felt, elastic goods, carriages, furniture, pumps, hydraulic presses, bobbins, and chemicals. Among its iron works are the Lowell machine shops, incorporated 1845, with a capital of $600,000, employing 1250 hands; the American bolt company, the Swaine turbine company, and R. Kitson's cotton machinery manufactory. Patent medicines are manufactured by Dr. J. C. Ayer & Co., printing 10,000,000 almanacs annually. The Lowell bleachery, with a capital of $300,000, employing 400 hands, dyeing 15,000,000 yds., and bleaching 10,000,000 lbs. annually. The city has beautiful public squares, and in the midst of the city's turmoil and traffic stands the monument to Ladd and Whitney, who were killed by a mob while marching through Baltimore with the 6th Mass. volunteer militia, April 19, 1861. The female operatives of its mills formerly supported a periodical called the *Lowell Offering*, famous as an exponent of the intelligence, thrift, and ambitious self-respect of the working-girl of Lowell.

LOWELL, CHARLES, D.D., 1782–1861; b. Boston; son of John (1743–1802); studied at Andover and graduated at Harvard in 1800; studied law and afterwards theology; spent some time abroad, studying for a while in Edinburgh; in 1806 was settled over the West church (Congregational) in Boston. When the controversy between the orthodox and the Unitarians arose, he refused to join either party, or to take a sectarian name, and did what he could to prevent a division. He was distinguished rather for benevolence and sweetness of heart than for learning. He published two volumes of sermons, besides several occasional discourses. He was the father of James Russell Lowell, poet and essayist, the present American minister at the British court.

LOWELL, CHARLES RUSSELL, 1835–64; b. Boston; son of Charles, D.D.; was a pupil of the Boston Latin school, and graduated with the highest honors at Harvard in 1854. He visited Europe, spending considerable time there in study and travel, and upon returning to the United States engaged in business. He left his position as superintendent of iron-works in Maryland to enlist in the war for the suppression of the rebellion. He served in the peninsular campaign as capt. of the 6th U. S. cavalry, and in n. Virginia and Maryland on the staff of gen. McClellan; was appointed col. of the 2d Massachusetts cavalry, and stationed for a time near Washington. He was next assigned to the command of a brigade, and rendered important service against Mosby's guerrilla bands, and in the resistance and pursuit of the confederate army under gen. Early from before Washington in 1864. He was with Sheridan in the Shenandoah valley, where his services were conspicuous and brilliant. Having been wounded early in the battle of Cedar creek, he refused to retire from the field, and in the moment of final victory received a hurt which proved mortal. As a recognition of his valor he was made brig. gen. of volunteers. Died at Middletown, Va.

LOWELL, FRANCIS CABOT, 1775–1817; b. Boston; son of John (1743–1802); graduated at Harvard in 1793; was a leading merchant in Boston, and among the first in the United States to engage in the cotton manufacture. The city of Lowell was named in his honor. Died in Boston.

LOWELL, JAMES RUSSELL, an American poet, was b. in Boston in 1819. He was educated at Harvard university. His *Legend of Brittany* appeared in 1844. In 1845 he published a prose work entitled *Conversations on some of the Old Poets.* His *Fable for Critics* and *The Biglow Papers* are racy with humor. In 1854 he succeeded Longfellow as professor of modern languages at Harvard; from 1857 to 1862, was editor of the *Atlantic Monthly,* and from 1863 to 1872 of the *North American Review.* He received the degree of LL.D. from the English university of Cambridge in 1874. In 1869 he published *Under the Willows, and other Poems,* and *The Cathedral,* an epic; in 1870, a collection of essays; and, in 1871, *My Study Windows.*

LOWELL, JAMES RUSSELL (*ante*), D.C.L., LL.D., graduated at Harvard law school in 1840, and for a short time practiced at the bar in Boston. He visited Europe in 1872, remaining two years, and was honored by being made the recipient in person of the degrees of D.C.L. at Oxford and LL.D. at Cambridge, England. After his return to America, Dr. Lowell took a warm interest in public affairs, and in 1876 was a delegate to the republican national convention. In June, 1877, he was appointed by president Hayes minister to the court of Spain, from which post he was transferred, in 1880, to the court of St. James; the appointment being received with signal expressions of gratification on the part of all classes of the British people, among whom Mr. Lowell's writings are even more popular than among his own countrymen. He married in 1844, MARIA WHITE, of Watertown, Mass. (1821–53), a gifted and accomplished woman. Besides translating with elegance and exactness from the German, she was the author of a number of poems of more than ordinary merit, a collection of which was privately printed in Cambridge, Mass. (1855), after her death. In her memory Longfellow wrote his beautiful poem entitled *Two Angels,* published in *Putnam's Monthly,* April, 1854:

'Twas at thy door, O friend, and not at mine,
The angel with the amaranthine wreath,
Pausing, descended, and, with voice divine,
Whisper'd a word that had a sound like death.

Then fell upon the house a sudden gloom,
A shadow on those features fair and thin,
And softly from that hush'd and darken'd room,
Two angels issued, where but one went in.

LOWELL, JOHN, LL.D., 1743–1802; b. at Newbury, Mass.; graduated at Harvard in 1760; was admitted to the bar in 1762, and in 1777 removed to Boston. He was a member of the continental congress in 1782–83; judge of the court of appeals from 1783 to 1789, of the U. S. district court from 1789 to 1801, and of the U. S. circuit court from 1801 till his death in 1802. The clause in the Massachusetts bill of rights which was interpreted as making slavery in that state illegal was written by him.

LOWELL, JOHN, LL.D., 1769–1840; son of John (1743–1802); b. at Newburyport, Mass.; graduated at Harvard in 1786; admitted to the bar in 1789; took up his residence in Boston, became eminent as a lawyer, and was an active, honored, and public-spirited citizen, but refused to take office. He was the author of many papers and pamphlets upon the current topics of his time.

LOWELL, JOHN, 1799–1836; b. Boston; son of Francis Cabot; educated at Harvard and Edinburgh; was a man of fine literary attainments and scholarly tastes; spent much time in foreign travel, and died at Bombay, India, leaving by will a legacy of $250,000 to found in Boston the "Lowell institute," which provides annually for free courses of lectures upon important subjects. This lectureship has supplied a platform for some of the most learned and vigorous thought of the eastern section of the United States.

LOWELL, MARY. See PUTNAM, MARY LOWELL.

LOWELL, ROBERT TRAILL SPENCE, D.D., b. Mass., 1816; educated at Harvard; in 1842 ordained in the church of England; and settled at Bay Robert, Newfoundland; Newark, N. J.; and Duanesburg, N. Y. He was for a time principal of St. Mark's school, Southborough, Mass., and in 1873 became professor of Latin in Union college. He has published *Fresh Hearts and other Poems; The New Priest of Conception Bay; Anthony Brade;* and *A Story or Two from an old Dutch Town.* He is a brother of James Russell Lowell.

LO'WENTHAL, ISIDOR, 1827–64; b. Posen, Prussian Poland, of Jewish parents; acquired the Hebrew language at an early age, exhibiting an extraordinary aptitude for philological studies. At 17 years of age, without having been to college, he had more than mastered the studies embraced in the college curriculum. He then accepted a mercantile clerkship, intending apparently to devote himself to a business life. He was a radical in politics and member of a liberal club, and a poem which he published in a newspaper having excited the attention of the government, he was constrained to flee to America. Reaching New York in the autumn of 1846, he was shortly afterward reduced to the necessity of becoming a street peddler in order to earn his bread. In these circumstances he found a friend in the Rev. S. M. Gayley, of Wilmington, Del., by whose means he gained a position as teacher of German and French in Lafayette college, Easton, Penn. While thus engaged he joined the senior class in the college and graduated in 1848. After this he became teacher of languages in the collegiate school at Mt. Holly, N. J. In 1851 he became a Christian, and in 1852 entered the theological seminary at Princeton, where he took high rank in philology, and wrote several important articles for the *Biblical Repertory.* In 1855 he became a tutor in the college at Princeton, but in 1856 he accepted from the Presbyterian board of foreign missions an appointment as missionary to the Afghans of India. On his arrival in that country he set himself to the task of learning Persian, Cashmiri, Hindustanee, Arabic, and the Afghan languages, and translated into the latter the whole of the New Testament. He had nearly completed a dictionary of that language when he was accidentally killed at Peshawar, a death which was an incalculable loss to missions in the East Indies.

LÖWENTHAL, JOHN JACOB, b. Buda-Pesth, Hungary, 1810; in 1841 was recognized as one of the best chess-players in Europe, and thenceforth was generally the victor in matches with the most renowned masters of the game. In 1849 he was constrained, for political reasons, to leave Hungary, and came to the United States, where he interested himself in his favorite game. In 1851 he went to London to engage in a chess tournament, and became a resident of that city, where he was employed in editing the chess department of several public journals. He also edited the *Chess-players' Magazine,* 1865–67, and superintended the publication of several books on the same subject. He was also for a time secretary of the St. George's and president of the St. James's club. In 1867–69 he published *Transactions of the British Chess Association.*

LOWER, RICHARD, b. Cornwall, 17th c.; educated at Westminster school and Christ church, Oxford; studied medicine under Dr. Thomas Willis. In 1674, in connection with Dr. Willis, he discovered the medicinal waters at Ashop, in Northamptonshire, which on their recommendation, became much frequented. In 1666 he went to London, practiced medicine, and became a fellow of the royal society and of the college of physicians. In 1669 he published his *Tractatus de Corde.* After Dr. Willis's death in 1675, he was at the head of the profession in London.

LOWER EMPIRE. See BYZANTINE EMPIRE, *ante.*

LO'WESTOFT, a seaport and bathing-place in the county of Suffolk, is situated on a height sloping gradually to the sea, 25 m. s.e. of Norwich. There are here two lighthouses, one on the height or cliff, the other to the s. of the town, in a lower locality. A profitable fishery is carried on; soles, mackerel, and herrings being caught in great numbers. The harbor of Lowestoft is spacious. Ropes and twine are manufactured. Pop. '71, 15,246. Lowestoft is the most easterly town of England.

LOWICZ. See LOVICZ, *ante.*

LOWNDES, a co. in s. Alabama, intersected in the e. section by the Mobile and Montgomery railroad, and the Western railroad of Alabama; 900 sq.m.; pop. '80, 31,178—31,099 of American birth, 25,540 colored. It has the Alabama river for its n. boundary, and is drained by a few small creeks. Its surface is slightly undulating and well wooded. It has a fertile soil adapted to the raising of live-stock, barley, oats, corn, cotton, sweet potatoes, and to the production of wool, honey, and sugar-cane. Cash value of farms in 1870, $2,271,911, numbering 954. Seat of justice, Hayneville.

LOWNDES, a co. in s. Georgia, having the state line of Georgia for its s. boundary; bounded on the n.e. by the Allapaha river, and on the s.e. by one of its branches; 550 sq.m.: pop. '80, 11,049—11,027 of American birth, 5,637 colored. It is bounded on the s.w. by the Little river, and the Ocopilco river; is watered by other small streams emptying into the Suwanee river; and is intersected centrally by the Savannah, Florida and Western railway. Its surface is generally level and sandy. It is covered to a great extent by forests of building timber. Its soil in some localities is fertile, and adapted to stock-raising and the production of cotton, wool, sweet potatoes, sugar-cane, rice, oats,

corn, rye, and the products of the dairy. It produced in 1870, 3,600 lbs. of honey. Its water power is utilized to some extent. Seat of justice, Valdosta.

LOWNDES, a co. in e. Mississippi, having the state line of Alabama for its e. boundary, intersected by the Mobile and Ohio railroad very near the w. border, with a branch from Artesia to Columbus; 500 sq.m.; pop. '80, 28,243—28,083 of American birth. It is drained by the Tombigbee river, navigable as far as Columbus, and the Oktibbeha river flowing from the n.w. and crossing the state line to unite with the Alabama river. Its surface is generally level, and has an extensive growth of pine and oak timber, with groves of cypress, elm, and hickory. Its soil is a fertile sandy loam, well adapted to stock-raising and particularly productive on the level river banks. Products are oats, corn, cotton, wheat, wool, and sweet potatoes. Cash value of farms in 1870, $2,079,973, numbering 805. It had in 1870, 75 manufacturing establishments, employing 368 hands, with a capital of $376,007, and an annual product of $412,097. Flour is manufactured, also woolen goods, tin, copper, and sheet-iron ware. Seat of justice, Columbus.

LOWNDES, RAWLINS, 1722–1800; b. West Indies; whence his parents removed to Charleston, S. C., where he rose to eminence at the bar, and in 1766 was made a judge by the crown; in this capacity affirming, with the majority of his court, against the dissenting opinion of the chief-justice, the validity of unstamped public papers. In the dispute between England and the colony, he was strongly committed to the cause of the latter, and while serving in the colonial assembly in 1768, he proposed the erection of a statue to William Pitt, as a mark of gratitude for his services in behalf of the colonies. In 1775 Lowndes was a member of the committee of public safety, and the next year of the committee charged with drawing up a new constitution for the province, of whose council he became a member. He was elected president of the province, and during his term of office sir Henry Clinton laid siege to Charleston with 12,000 regular troops, and in spite of the efforts of Lowndes, it was captured May 12, 1780. After the close of the war he again entered the legislature, and in the debates upon the adoption of the federal constitution, he was among the bitterest opponents of that instrument, saying in one of his speeches: "I wish no other epitaph then this 'Here lies one who opposed the federal constitution, holding it to be fatal to the liberties of his country.'"

LOWNDES, WILLIAM JONES, LL.D., 1782–1822; b. S. C.; son of Rawlins. His preliminary education was obtained in England, after which he graduated at Charleston college, and entered the bar. After serving four years in the state legislature, in 1810 he was elected to congress, to which he was returned by successive re-elections till his death. He was a republican in his politics according to the party division of his times, and chairman of the ways and means committee, 1818–22.

LOWNDES, WILLIAM THOMAS, 1800–43; b. England, where he carried on the trade of a bookseller. He was an enthusiastic bibliographer, and published two books of standard authority in their department; *The Bibliographer's Manual of English Literature*, 4 vols., 1834; and *The British Librarian or Book Collector's Guide*, 1839. But 11 parts of the latter had been completed when the author succumbed to insanity brought on by pecuniary difficulties.

LOWRIE, WALTER, 1784–1868; b. Edinburgh, Scotland; removed with his parents in 1791 to Huntingdon co., Penn., but soon went to Butler co., which they made their permanent residence. He grew up on his father's farm, and his early education was limited, though his religious training was thorough. At the age of eighteen, he entered upon a course of study with the ministry in view. He studied Latin, Greek, and Hebrew, with great diligence and success. Providential circumstances compelled him to abandon his purpose, and he entered upon other pursuits. Having won the confidence and esteem of the community in which he lived, he was in 1811, at the age of 27, elected to the senate of Pennsylvania, and after serving the state in this office for seven years, he was sent to the senate of the United States. His term of service expiring in 1824, he was made secretary of the senate, and held the office 12 years. This he might have held for life, as others had done, and many members of the senate without distinction of party urged him to retain the place. In the senate were Webster, Clay, Calhoun, Randolph, Benton, and other illustrious men, when the measure known as the *Missouri Compromise* was earnestly discussed. Among these was Lowrie, whose integrity won their confidence, while his sagacity and practical judgment led them to seek his advice and rely upon his opinions. One who was present at the time has said that he was regarded by the senators who knew him best as an authority upon all questions of political history and constitutional law. His religious influence in congress was great. He with Frelinghuysen and others founded the congressional prayer-meeting, and was one of the founders of the congressional total-abstinence society. In 1836 he was elected corresponding secretary of the Western foreign missionary society, and in 1837 of the board of foreign missions of the Presbyterian church, which office he held for 32 years. While in the senate he was a member of the committee on Indian affairs, and became deeply interested in the fate and evangelization of the tribes, whom when secretary he visited, and whose interests he zealously and wisely labored to promote. Mr. Lowrie's oldest son John, who succeeded his father as secretary, and now occupies that position, was three years a missionary in India. His third son Walter was a missionary for five years in China, and

was thrown into the sea by pirates. His fourth, Reuben was also in China, and after six years' labor fell a sacrifice to constant work and the enervating effect of the climate.

LOWTH, ROBERT, D.D., an English prelate, son of the rev. William Lowth, rector of Buriton, in Hampshire, was b. Nov. 27, 1710. He was educated at Winchester school, whence, with a reputation both as a scholar and poet, he passed to New college, Oxford, in 1730. Here he continued to distinguish himself, took his degree of M.A. in 1737, and only four years after, was appointed professor of poetry. In 1750 bishop Hoadley conferred on him the archdeaconry of Winchester, and in 1753 the rectory of East Woodhay, in Hampshire. During the same year, he published in Latin his excellent *Lectures on Hebrew Poetry* (*De Sacra Poesi Hebræorum Prælectiones Academicæ*). It was greatly admired both in England and on the continent, where the celebrated Michaelis republished it with notes and emendations. These were incorporated by Lowth himself in a second edition, 1763. A new edition was published by Rosenmüller (Leip. 1815). In 1754 Lowth received from the university of Oxford the degree of D.D., became prebendary of Durham and rector of Sedgefield in 1755, a fellow of the royal societies of London and Göttingen in 1765, bishop of St. Davids in 1766, of Oxford a few months after, of London in 1777, and died Nov. 3. 1787. Besides his lectures, his two principal works are *Life of William of Wykeham* (1758) and *Isaiah, a New Translation, with a Preliminary Dissertation, and Notes, Critical Philological, and Explanatory* (1778; German edition, by Koppe, Gött. 1779; third edition in English, 1842); a work rather too elegant and ornate as a version, but of great value as a means of correcting the numerous blunders of the "authorized version," and of exhibiting how thoroughly literary and artistic is that section of Hebrew poetry which we call prophecy.

LOXA. See LOJA, *ante*.

LOXODON, a genus of elephants of which the present African elephant is the type, and proposed by F. Cuvier, because he thought the differences between the only living species, African and Asiatic, are more than those which should separate mere species of one genus. The name loxidon refers to the lozenge-shaped lamellæ seen upon the grinding surfaces of the molar teeth, the structure being intermediate between that found in the molars of the Indian elephant and that found in the molars of the extinct genus *stegodon* of the upper miocene formation of India.

LOXODRO'MIC LINES (Gr. *loxos*, oblique, and *dromos*, course) are curves of double curvature on the surface of a sphere or spheroid, which have the property of cutting all meridians at the same angle. The course of a ship which is sailing in an oblique direction always to one point of the compass, is a loxodromic line, or, in nautical phrase, a *rhumb line*. These lines appear as straight lines on *Mercator's Projection* (see MAP). A ship sailing obliquely to the direction of the north pole (say, two points off) would wind round it in infinite circuits, always approaching nearer, but never reaching it. In this property, as well as in others, the loxodromic line is analogous to the common logarithmic spiral.

LOYO'LA, IGNATIUS DE (IÑIGO LOPEZ DE RECALDE), the youngest son of Bertram de Loyola and Marina Salez de Baldi, was b. in the year 1491 at his ancestral castle of Loyola, in the Basque provinces. After the scant training of that age in letters he was received as a page in the court of Ferdinand; but the restraint and inactivity of court-life were distasteful to his enthusiastic mind, and, under the auspices of his relative, Don Antonio Manriquez, duke of Najura, he embraced the profession of arms. The details of his career as a soldier are of little importance in his history, although they display in a very marked way both the excellency and the irregularities of his ardent temperament, thrown undirected among the temptations as well as the duties of a military life. Of his bravery and chivalrous spirit many remarkable instances are recorded, and one of these proved the turning-point of his career. In the defense of Pampeluna he was severely wounded in both legs, one being fractured by a cannon-ball, and the other injured by a splinter, and having been taken prisoner by the French, was by them conveyed to his paternal castle of Loyola, where he was doomed to a long and painful confinement. After a very painful operation, the results of which had well-nigh proved fatal, he eventually recovered; and with his returning strength he appears to have resumed his old thoughts and his habitual levity, for, in order to remove a deformity which had resulted from the first setting of his wounded limb, he consented to the painful remedy of having it re-broken in order to be reset. After this operation his convalescence was even more slow; and the stock of romances, by which he was wont to relieve the tedium of confinement, having been exhausted, he was thrown upon the only other available reading, that of the *Lives of the Saints*. The result was what might be expected in so ardent a temperament—the creation of a spiritual enthusiasm equally intense in degree, although in kind very different from that by which he had hitherto been drawn to feats of chivalry. The spiritual glories of St. Francis or St. Dominic now took, in his aspirations, the place which had been before held by the knights of mediæval romance. With souls like his there is no middle course: he threw himself, with all the fire of his temperament, upon the new aspirations which these thoughts engendered. Renouncing the pursuit of arms, and with it all other worldly plans, he tore himself from home and friends, and resolved to prepare himself for the new course

which he contemplated by a pilgrimage to Jerusalem. With a view to his immediate preparation for this holy task he retired in the garb of a beggar to the celebrated monastery of Montserrat, where, on the vigil of the feast of the annunciation, in 1522, he hung up his arms, as at once a votive offering significative of his renunciation of the works of the flesh, and an emblem of his entire devotion to the spiritual warfare to which he was from that moment vowed. From Montserrat he set out barefooted on his pilgrimage, the first step of which was a voluntary engagement which he undertook to serve the poor and sick in the hospital of the neighboring town of Manresa. There his zeal and devotion attracted such notice that he withdrew to a solitary cavern in the vicinity, where he pursued alone his course of self-prescribed austerity, until he was carried back, utterly exhausted, to the hospital in which he had before served. To this physical exhaustion succeeded a state of mental depression, amounting almost to despair, from which, however, he arose with spiritual powers renewed and invigorated by the very struggle. From Manresa he repaired by Barcelona to Rome, whence, after receiving the papal benediction from Adrian VI., he proceeded on foot, and as a mendicant, to Venice, and there embarked for Cyprus and the Holy Land. He would gladly have remained at Jerusalem, and devoted himself to the propagation of the gospel, among the infidels; but not being encouraged in this design by the local authorities, he returned to Venice and Barcelona in 1524. Taught by his first failure he now resolved to prepare himself by study for the work of religious teaching, and with this view was not ashamed to return, at the age of 33, to the study of the very rudiments of grammar. He followed up these elementary studies by a further course, first at the new university of Alcala, and afterwards at Salamanca, in both which places, however, he incurred the censure of the authorities by some unauthorized attempts at religious teaching in public, and eventually he was induced to repair to Paris for the completion of the studies thus repeatedly interrupted. Here again he continued persistently to struggle on without any resources but those which he drew from the charity of the faithful; and here again he returned to the same humble elementary studies. It was while engaged in these studies, and among the companions of them, that he first formed the pious fraternity which resulted in that great organization which has exercised such influence upon the religious, moral, and social condition of the modern world. From the close of his residence in Paris, Loyola's history has been told in the history of his order. See JESUITS. From the date of his election as the first general of his society, he continued to reside in Rome. To him are due not alone in the general spirit, but even in most of their details, all its rules and constitutions; from him also originated several works of general charity and benevolence, the germs of great institutions still maintained in Rome; but the great source of his influence upon the spiritual interests of the world is his well-known *Exercitia Spiritualia*, of which an account has been already given. He died at Rome, it may well be believed, prematurely, being worn out by his long-continued austerities, July 31, 1556. His name was admitted to what is known in the church of Rome as the preliminary step of beatification, in the year 1609, and he was solemnly canonized as a saint by Gregory XV. in 1622. His life has been written in almost every European language. The biographies of Ribadaneira, of Maffei, of Bartoli, and Bouhours are the best known and the most popular among Roman Catholics.

LOYSON, CHARLES (monastic name, FATHER HYACINTHE), b. at Orleans, Mar. 10, 1827. He studied at St. Sulpice, and after becoming priest taught philosophy and theology at Avignon and Nantes. Subsequently entering the order of the Carmelites, he became known as a powerful preacher, and gathered crowded and enthusiastic audiences of all ranks of society to the Madeleine and Notre Dame in Paris. Almost as remarkable as his eloquence was the boldness with which he denounced existing abuses in the church; and the archbishop Darboy defended him against the accusations of the Jesuits till, in 1869, the general of his order imposed silence on him. Loyson replied by a letter in which he called for a thorough reform of the church, and was excommunicated. Relieved from monastic vows by the pope, he became a secular priest under the name of the abbé Loyson. He protested vigorously against the infallibility dogma; but although he attended the "old Catholic" congress at Munich, and on visits to the United States and England fraternized with Protestants, he always declared his intention to remain in the Catholic church, trying to obtain reforms, such as the liberty of marriage for the clergy. In 1872 he married an English wife. In 1873 he was chosen curé of a congregation of liberal Catholics at Geneva, but soon left them, finding them to be "neither liberal in politics nor Catholic in religion." He has published a number of sermons and lectures, some of them in English.

LOYSON, CHARLES (*ante*), PÈRE HYACINTHE, b. France, 1827, was educated at Pau and in the theological school of St. Sulpice until the age of 22, when he became a priest. After ten years of priesthood and two of novitiate in the Carmelite convent in Lyons, he joined that order. He preached in Bordeaux and other French cities, attracting general public attention by his eloquence and enthusiasm, and in the summer of 1865 at the Madeleine and at Notre Dame in Paris. Having become notorious for the enunciation of sentiments more liberal than the doctrines of the church permitted, he was obliged to explain his orthodoxy before the pope. He succeeded in clearing himself temporarily, but again employed language which was considered subversive of church

discipline, and he was threatened with the major excommunication and forbidden to preach in Notre Dame. In a letter which Loyson addressed to the general of the barefooted Carmelites at Rome he wrote: "It is my profound conviction that if France in particular and the Latin races in general are given up to social, moral, and religious anarchy, the principal cause is not Catholicism itself, but the manner in which Catholicism has for a long time been understood and practiced." As this statement, which was made public, was an attack on the alleged abuses in the church, it produced a profound sensation, and tended to connect the author with the antagonists of the papacy In the autumn of 1869, the year of his enunciation of the new conclusions which he had reached, Loyson paid a visit to America, and was warmly welcomed by distinguished Protestants and liberal Roman Catholics in the United States. In the following year he was released from his monastic vows by the pope, and soon after preached in Rome. On Sept. 2, 1872, he was married in London to Mrs. Emily Jane Meriman, the widow of an American gentleman. The abbé Loyson was elected curé of Geneva, but resigned in 1874. He delivered lectures in London in 1876, and a translation by his wife of some of his letters, fragments, and discourses was published in London in 1874.

LOZENGE, in heraldry, a charge generally enumerated among the sub-ordinaries, in the shape of a rhombus placed with the acute angles at top and bottom. The horizontal diameter must be at least equal to the sides, otherwise it is not a lozenge, but a fusil (q.v.). The term *lozengy* is applied to a field divided by diagonal lines crossing one another at regular intervals so as to form a diamond pattern, the compartments being of alternate tinctures.

LOZENGES are employed in medical practice in those cases in which it is desired that the remedy should pass gradually into the stomach, in order to act as much and as long as possible upon the pharynx and the laryngeal opening; as, for example, in cases of relaxed or inflamed states of the tonsils and uvula, in chronic coughs, etc. According to Dr. Paris (*Pharmacologia*, 9th ed. p. 555), lozenges should be composed of several demulcent substances, such as farinaceous matter, sugar, gum, and isinglass, since such a mixture retards as long as possible their solution. Lozenges are flat and circular or oval in form, and the chief difference between lozenges and the closely allied substances known as *drops*, is that in the latter the sugar is rendered fluid by means of heat, while in the former the ingredients are combined without the aid of heat.

LOZÈRE, a department in the s. of France, derives its name from mount Lozère, one of the summits of the Cevennes (q.v.), and is formed out of the province of Languedoc. It comprises the arrondissements of Mende, Florac, and Marvejols. Area, 1990 sq.m.; pop. '76, 138,319, among whom are many Protestants. The department is mountainous, the central mass of the Cevennes, here called the Margeride mountains, occupying the whole of the e. and s.e. portions. In the mountains the climate is severe and variable, and little grain is produced; but the slopes on the southern side of the Cevennes, looking towards the valley of the Rhone, are clothed with the mulberry, the olive, and the vine. Wolves abound in the forests, which are extensive. Cattle, sheep, and mules are reared and exported in considerable numbers; but the real prosperity of the department arises from its mines, which yield iron, antimony, lead, copper, silver, and some gold. Capital, Mende.

LUALABA RIVER. See CONGO, *ante*.

LUBBOCK, Sir JOHN, b. England, 1834; son of John William, who took him into partnership in his bank in London in 1856, and upon whose death, in 1865, sir John succeeded to the baronetcy. He was a member of the international coinage commission, the public school commission, and the advancement of science commission. In 1870 he was returned to parliament, and re-elected in 1874 and again in 1880. In parliament he carried through a number of important measures, such as the falsification of accounts bill, the bank holidays act, and the absconding debtors act. But he has most distinguished himself by his inquiries into the condition of ancient man, and his writing on zoological subjects. Sir John has published *Prehistoric Times; Origin of Civilization; British Wild Flowers; Origin and Metamorphoses of Insects; Scientific Lectures; Monograph of the Thysanura and Collembola;* and a volume of political and educational addresses. He is a fellow of the royal, Linnæan, and many other learned societies.

LUBBOCK, Sir JOHN WILLIAM, 1803-65; b. England, educated at Cambridge, and succeeded to the baronetcy in 1840. He devoted himself to astronomical research, and contributed many papers to the proceedings of the royal astronomical society and the royal society, of which latter he was elected a fellow at the age of 26. A series of his papers in the *Philosophical Transactions* was published in 1833, in book form, under the name, *On the Theory of the Moon*, and other papers were separately issued as tracts, such as an *Elementary Treatise on the Tides* and *Classification of the Different Branches of Human Knowledge*. He also pursued investigations into the theory of mathematical notation and meteorology.

LÜ'BECK, one of the three remaining free cities of Germany, is situated on the river Trave, about 40 m. n.e. of Hamburg, and 14 from the Baltic. It is built on a rising ground, and its appearance with its walls and ramparts still partly standing, its great gates, its proud towers, its Gothic churches, and its antique gabled houses is still almost

mediæval. Its principal buildings are St. Mary's church (*Die Marienkirche*), one of the most beautiful specimens of Gothic architecture in the n. of Europe, finished in 1304, with three naves, the central one 119 ft. in length, and two towers, 382 ft. high; the town-house, containing the Hanseatic archives and a public library of 50,000 volumes, built of red and black glazed tiles; the cathedral, built 1170–1341; the monastery church, also a masterpiece of Gothic; the exchange, and the banks. Lübeck is rich in educational establishments of all kinds, religious and secular—the number within the city amounting to 54, while in the suburbs there are no less than 37, in all 91. The provision for the poor is excellent, on account of the large bequests that citizens have made at different periods for this purpose, the largest benevolent institution being the hospital of the Holy Ghost. The industrial activity of Lübeck is considerable. Ship-building and engineering are carried on; there are also many breweries and important cigar-manufactories; yet in the old days when the Hanseatic league was flourishing, the Merchant company or college could reckon 5,000 members, while in 1859 it had only 471. The fisheries of Lübeck are important and prosperous. The chief imports are wine, silks, cottons, earthenware, pigments, colonial products, and timber from Sweden and Finland; the chief exports are grain, cattle, iron, and wool. The harbor lies 16 or 17 m. down the river, at Travemünde, a bathing-place, although the river has of late years been so much deepened that the largest ships can come up to Lübeck. The income of the city and territory in 1879 was £129,980; the public debt, £1,190,200. In 1878, 2,302 vessels, of 301,910 tons, entered the port of Lübeck, and 2,332, of 307,557 tons, cleared. Pop. of town and suburbs, in 1875, 44,799; of the territory, 56,912.

Lübeck has existed since the 11th c., and received important privileges from the German emperors in the 12th c., which were confirmed by the Danes, into whose power it fell in 1201. It was declared a free city of the empire in 1226, and thereafter maintained its independence against the Danes, and joined the other commercial towns in the great Hanseatic league (q.v.). With the decline of the Hanseatic league, Lübeck lost its historic importance, but continued a flourishing and independent commercial city, till it was taken and plundered by the French, Nov. 6, 1806. Its trade suffered also grievously from the French continental system. In 1810 it was incorporated with the French empire. It recovered its independence in 1813, and is now a member of the German empire. Its trade has also revived; and the railway connection with Hamburg, and lines of steamers to ports of the Baltic, have contributed much to the increase of its prosperity. It possesses a territory 109 sq.m. in extent.

Constitution.—The constitution, which was anciently aristocratic, has been democratic since 1669. The government is intrusted to a senate, which consisted, till 1851, of twenty members; but since that year, of only fourteen, who, in legislative and also in certain administrative functions, require the concurrence of the municipality or council of citizens, a body comprising 120 members. The supreme court of appeal for the free cities was in Lübeck till 1879, when the imperial courts became supreme; and Lübeck law (*Lübisches Recht*) is of acknowledged authority in many questions.

LÜBKE, WILHELM, b. Westphalia, 1826; professor of architecture at Berlin, of archæology at Zürich, and since 1866 of the history of art at Stuttgart. Among his works are an *Introduction to the History of Ecclesiastical Art in the Middle Ages; Mediæval Art in Westphalia; History of Architecture; Studies in the History of Art;* and *An Outline of the History of Architecture,* which has been translated into English by Clarence Cook.

LUBLIN, a government of Russia, in Poland, comprising the circles of Lublin, Chelm, Josefow, and Zamoski, formerly belonging to Galicia, and ceded by Austria in 1810 to what was then the duchy of Warsaw. It lies between 50° 17′ and 51° 43′ n. lat., and 21° 45′ and 24° 7′ e. long.; 11,975 sq.m.; pop. 738,426. On the n. it has Podlachia, on the e. Volhynia, Galicia on the s., and on the w. Sandomir, from which it is separated by the Vistula; the river Bug dividing it from Volhynia, and the Wieprz from Podlachia. It is heavily wooded and has extensive morasses; but there are tracts of good arable land and excellent pasturage, with a fine breed of cattle. The only metal found is bog-iron. Capital, Lublin.

LUB'LIN, the capital of the Polish government of the same name, on the left bank of the Bistritz, a feeder of the Wieprz, a branch of the Vistula, is 96 m. s.e. of Warsaw. Lublin dates from the 10th c., and among the objects of interest which it presents to tourists, the church of St. Nicholas (founded in 986 A.D.) and the ruins of a royal castle are worth notice. It was formerly fortified. The chief buildings are the town-hall, the Sobieski palace, cathedral, Jews' synagogue, Piarist college, and several schools and hospitals. It has several manufactories of woolen and linen goods, in which as well as in corn and Hungarian wine it carries on an extensive trade. Pop. '67, 20,789. Three large fairs, each lasting one month, are held here annually.

LUBRICATION, the application of a substance to a surface for the purpose of making it smooth. This substance, which is called a lubricant, may be either a liquid, a semi-liquid, or a solid. Plumbago, or black-lead, is in most common use as a solid lubricant, but powdered soap-stone, or talc, is used for many purposes, as, for instance, by shoemakers upon the inside of the heels of boots and shoes to facilitate the pulling on. When it is desired to have a rope or cord slip over a bearing, as a pin, or a pulley which refuses to turn, it is usual to smear it with lard. Grease is the common lubricant,

but for machinery, or the bearing of axles generally, other substances may be added which will materially reduce the friction. Mineral oils, particularly the thicker portions of petroleum, have valuable lubricating properties, and may be used either alone or added to lard, tallow, or animal oils, according to the size, weight, and velocity of the revolving shaft. Oils are used for high speed; pasty lubricants for large and heavy bearings. There are a great variety of lubricants used for the axles of common road carriages, many of them patented. Perhaps the most favorite lubricant for light, fine road carriages, which are furnished with tight boxes, is castor oil. When the box is not very tight, a mixture of lard and rye flour may be used with advantage. It has the property of lasting, when mixed in the proportion of about 4 parts of grease to one of flour. Black-lead may be used in combination with lard and flour, or it may alone be mixed with lard or oil. Some vehicles are made with wooden axles, and for these common pine tar is an economical, lasting, preservative, and efficient lubricant. Its application may be alternated with lard, or a mixture of lard and tallow, or lard, tallow, and flour; but it is well to have some tar always present. Wherever great delicacy of motion is required, as in watches and other time-pieces, the lubricant must be very fluid. The lubrication may be performed by manual application, or mechanical devices may be employed. There are many kinds of lubricators. They are in the form of reservoirs, which discharge their contents, the lubricants, as fast as they are consumed by the revolving shaft or piece of moving machinery. A simple and often a very efficient lubricator is an inverted oil-can suspended over the bearing or place which requires lubrication. When a pasty lubricant is used, it may be applied on a sponge or brush, if the situation favor such application. The ingenuity of the operator is often advantageously exercised as well as that of the inventor.

LUCA GIORDANO. See GIORDANO, *ante*.

LUCAN, GEORGE CHARLES BINGHAM, Earl of, 1800; b. England. After passing through Westminster school, he entered the army, and took part as a volunteer with the Russian forces in the Turkish campaign of 1828. He was a conservative member of parliament for county Mayo, 1826–30, and was elected a representative peer for Ireland in 1840. He served through the Crimean war, and participated in the battles of the Alma, Balaklava, and Inkermann. He was made lieut.-gen. in 1858, and gen. 1865.

LUCA'NIA, a district of s. Italy, or Magna Grecia, extending from the Tyrrhenian sea on the w. to the gulf of Tarentum on the e.; bounded s. by Bruttium, n. by Apulia and Samnium, n.w. by Campania. With the exception of an extensive plain between the Apennines and the gulf of Tarentum, Lucania is mountainous. It was one of the wildest parts of Italy, and sent from its mountain forests wild swine for the amphitheaters of Rome. Its chief rivers were the Silarus (*Selè*), the Aciris (*Agri*), Bradanus (*Bradano*), Siris (*Sinno*), Sybaris (*Cosile*), besides many other streams. The principal cities were Sybaris, Heraclea, Metapontum, and Thurium on the e. coast; Pæstum and Elea or Velia on the coast of the Tyrrhene sea; Pandosia and Potentia in the interior. The original inhabitants of Lucania were the Chones and Œnotrians; who were gradually subdued by the Samnites from the n., B.C. 300. A league was formed against Lucania by the cities of Magna Grecia about 393 B.C., and a great battle fought in 390, when the Lucanians were victorious. In 272 they were subdued by the Romans. The territory of Lucania forms chiefly the modern provinces of Basilicata and Principato.

LUCA'NUS, M. ANNÆUS, the chief Roman poet of the silver age, was b. at Corduba (the modern *Cordova*), in Spain, 38 A.D., and brought to Rome in his infancy by his father, who was a younger brother of the philosopher Seneca. He received an education of the best kind, was a school-fellow of Persius, and a friend of the emperor Nero, and entered on life with the most brilliant prospects. He became quæstor and augur, and declaimed and recited in public with the highest applause. But his prosperity and himself were equally short-lived. He lost the favor of Nero, who was jealous of his poetry and his fame, and who desired to keep down both. Under the sting of this annoyance, he joined the conspiracy against Nero's life in 65 A.D. It is painful to read in Tacitus, that when arrested with others after the betrayal of the plot, he tried to save his life by accusing his mother of complicity. But the emperor did not spare him for the sake of this additional crime; he was compelled to destroy himself by having his veins opened, and he died in this way, and with a certain ambitious composure, at 27 years of age. Whatever the faults of Lucanus's character—and in the brief notices we have of him, both his vanity and levity are apparent—he holds a conspicuous place among the poets of Rome. The only work of his that has come down is the *Pharsalia*, an epic, in 10 books, on the civil war between Cæsar and Pompey. As an epic, it is, as Niebuhr somewhat quaintly says, an "unfortunate" performance, for it proceeds in the manner of annals, and wants the comprehensiveness, unity, and learning of the greatest works of its class. Nor is its style, generally speaking, good, for it is often turgid and obscure, and marked with those defects of taste which belong to poems inspired by a rhetorical age and school of writing. But when every deduction has been made, the *Pharsalia* affords ample proof that Lucanus was a man of real and powerful genius. There is an eye for the sublime both in the moral and physical worlds, constantly present in it; there is all the vigor of poetic oratory in its declamations; and there are felicities of epigram

which have secured to many a line a constant freshness of life, as part of the familiarly remembered literature of the world. Lucanus was very popular in the middle ages; and in modern times, his poem has been a particular favorite among the lovers of political freedom—especially among that school of classical republicans now nearly extinct in Europe, after having played a most important part in it. There is a well-known English translation of Lucanus by Rowe, which Dr. Johnson thought one of the best translations in the language.

LUCANUS AND LUCANIDÆ. See STAG BEETLE.

LUCARIS, CYRIL, a Greek theologian, was b. in the island of Candia in 1572, studied first at Venice, and afterwards at Padua, and subsequently visited Germany, where he formed intimate relations with the Protestant doctors, and carried back into Greece their spirit and their dogmas. Ordained a priest, he rose, in the course of years, to the highest dignity in the Greek church, being elected patriarch of Constantinople in 1621. He still cherished his Protestant opinions, and endeavored even to promulgate them in the church over which he ruled; but his conduct excited violent opposition among the clergy, and Lucaris was in consequence banished to Rhodes. Through the influence of the English ambassador, however, he was soon reinstated in his office. Unluckily, a confession of faith he had got printed, quite heretical—i.e., Protestant—in its character, fell into the hands of his adversaries, and he was once more involved in difficulties. In 1636 he was banished to the isle of Tenedos, and though recalled after a few months, in June, 1637, he was seized in Constantinople, hurried on board a vessel, and it was never properly ascertained what became of him. According to some, he was strangled in the ship which bore him off; according to others, he suffered this fate in a castle on the shores of the Black sea. His doctrines have been repeatedly condemned by Greek synods.

LUCARNE, a dormer window (q.v.). The name lucarne is generally applied to the small dormers in church spires.

LUCAS, a s. central co. of Iowa, traversed by the Chariton river and Whitebreast creek, and crossed by the Burlington and Missouri railroad; 432 sq.m.; pop. '80, 14,530. The surface is varied and the soil fertile, producing Indian corn, wheat, oats, and hay. This county contains a portion of the coal-measures of Iowa. Co. seat, Chariton.

LUCAS, a co. in n.w. Ohio, on lake Erie and the border of Michigan; drained by the Ottawa river, and having the Maumee river on the s.e.; traversed by the Lake Shore and other railroads, centering at Toledo; 300 sq.m.; pop. '80, 67,388. With a level country, there are extensive forests of sugar-maple, tulip-tree, elm, hickory, white-oak, beech, ash, etc. The soil is productive. There are important manufactures, and the leading productions are cotton, grain, and wool. Co. seat, Toledo.

LUCAS, FREDERICK, 1812–55; b. England. After graduating at the London university he was called to the bar. In 1839 he left the society of Friends, in whose tenets he had been brought up, joined the Roman Catholic church, and published his *Reasons for Becoming a Roman Catholic.* He established the *Tablet* newspaper, as an organ of Roman Catholic opinion; conducting it in London at first, but afterwards in Dublin. He was elected to parliament for the county Meath in 1852, and was regarded as the parliamentary leader of the Roman Catholic party. He had constantly urged, in his newspaper, in the *Dublin Review,* and in his political addresses, that it was the duty of the priests to participate in politics. Considerable opposition being manifested to such a course of action, he went to Rome to secure, if possible, the sanction of the pope for his opinions; but he was obliged to leave from ill-health, before a decision was reached.

LUCAS, PAUL, 1664–1737; b. at Rouen, France; son of a goldsmith; as a dealer in precious stones traveled in Greece, Asia Minor, Syria, and Egypt; entered the naval service of the Venetians, participated in the siege of Negropont in 1688, and became capt. of an armed vessel sent to cruise against the Turks. He returned to France in 1696, and sold a fine collection of curiosities to the royal cabinet. Again he visited Egypt and ascended the Nile; went to Tripoli by sea, and joined a caravan in its journey through Armenia and Persia. After being robbed at Bagdad, and taken prisoner by a Dutch privateer, he reached Paris in 1693, and in 1704 published his adventures under the title of *Voyage au Levant.* After this he made another journey to the East, where he collected inscriptions and made plans of buildings in Palestine, Syria, Cyprus, Egypt, and the Barbary states, Of this journey he gave an account in a volume published in 1714. The government sent him on new antiquarian expeditions in 1714 and 1723. In 1736 he went to Spain, where he was employed by Philip V. in arranging his cabinet of antiquities. D. at Madrid.

LUCAS, ROBERT, 1781–1853; b. at Shepherdstown, Va.; a descendant of William Penn. In 1800 he went to Ohio, and in the war of 1812–15 entered the service as capt., and was promoted to be first a lieut.col. of the U. S. army, and then a brig.gen. of Ohio militia. He presided over the convention which nominated Jackson for president in 1832; was governor of Ohio 1832–36, and governor of the territory of Iowa 1838–41. D. at Iowa City, Iowa.

LUCAS, SAMUEL, 1818-68; b. Bristol, Eng.; graduated at Queen's college, Oxford, in 1842, having won the Newdegate prize for a poem, and the chancellor's prize for an English essay. He was admitted to the bar of the Inner Temple in 1846. In 1853 he entered the profession of journalism as editor of the *Press*, and, a year later, became literary editor of the *Times*. Three volumes of his essays in that journal have been published, viz.: *Eminent Men and Popular Books, Biography and Criticism*, and *Mornings of the Recess*. From 1859 to 1865 he edited *Once a Week*, and then founded the *Shilling Magazine*. A volume, *Charters of the Old English Colonies*, edited by him, appeared in 1850; and twelve years later he collected a series of his essays from the quarterly reviews into a volume entitled *Secularia, or Surveys on the Main Stream of History*. In politics he was a conservative. D. at Eastbourne, Sussex.

LUC'CA, DUCHY OF, formerly a small independent state, now a province of central Italy, was bounded on the n. by Modena, on the e. and s. by Tuscany, and on the w. by the gulfs of Genoa and Massa. Area, 512 sq.m.; pop. '71, 280,070. The surface of the country is very diversified; the largest stream is the Serchio. Lucca is famed for the extreme fertility of its soil, and the superiority of its agriculture, which serves as a model to the whole Italian peninsula. The principal products are grapes, olives, grain, mulberries, chestnuts, and vegetables. The marshy flats on the coast afford excellent pastures for cattle. The manufactures are silks, oil (esteemed the best in Italy), glass, paper, linens, cottons, etc.; the principal export is oil. The Lucchesi are a frugal, shrewd race; numbers leave home in search of employment, and they form a large proportion of the itinerant figure-venders, organ-grinders, and stucco-workers of Europe.

Lucca (anciently called *Luca*) was made a Roman colony in 177 B.C. It was erected into a duchy by the Lombards, and recovered its liberty in 1055, when the chief town, Lucca, became a free city. In 1327 it was a duchy, and was ruled by the celebrated Castruccio Castracani. In 1370 it became an independent republic, was erected into a principality in 1805 by Napoleon for his sister Elisa Bacciochi, and passed to Maria Louisa of Spain in 1815. Her son, duke Carlo Luigi, ceded it to Tuscany in 1847, on obtaining possession of Parma and Piacenza; and in 1860 it was annexed to Sardinia. It now forms one of the Tuscan provinces in the new kingdom of Italy.

LUCCA, chief t. of the Italian province of Lucca, is situated in a fine plain, bounded by picturesque hills, and irrigated by the Serchio, 12 m. n.e. of Pisa. Pop. '72, 21,286. The commercial activity of its inhabitants obtained for it the name of "Lucca l'Industriosa." Its great trade is in olive-oil and silk, and it was the first place in Italy where the production and manufacture of silk were successfully introduced. The town is surrounded by ramparts, which form a delightful promenade, and command a fine view of the whole valley of the Serchio; the streets are mostly narrow and crooked, but well paved; the private dwellings are commodious, and the public edifices numerous and interesting. The cathedral contains several fine paintings. A splendid aqueduct, planned during the reign of the princess Elisa Bonaparte, and executed later, supplies the town with water, and is highly deserving of inspection. The environs of Lucca abound in delightful villas. In a charming valley, 15 m. from the town, are situated the famous mineral baths of Lucca, whose temperature varies from 96° to 136° F. The waters are exported to all parts of Italy.

LUCCA, PAULINE, b. Vienna, 1842; the daughter of Jews in humble life, she entered the chorus of a theater when only 14 years of age, but 3 years later had developed so much musical ability that she was cast for the part of "Elvira" in *Ernani*. She now attracted the attention of Meyerbeer, the composer, and through his influence succeeded in obtaining an engagement in Berlin, where she continued to be a favorite artist until 1872. During this period she sang also in London and St. Petersburg, and achieved a continental reputation. She married the baron von Rhaden, but was divorced from him. She visited the United States in 1872, making her first appearance at the academy of music, New York, Sept. 30, in that year. Here she became a popular favorite; her remarkable dramatic power, rich, full voice, and brilliant execution attracting favorable criticism in every quarter. Returning to Europe, she continued to sing in the principal cities, her professional career being marred only by her eccentricities of temper, which involved her in constant disputes and breaches of contract with her managers, on account of which she was frequently mulcted in heavy damages. As an actress, she has hardly been surpassed on the operatic stage, except perhaps in the single instance of Giulia Grisi. But both in her acting and her vocalization she has been largely subject to the influence of moods inseparable from her volatile temperament.

LUCE'NA, a t. of Spain, province of Cordova, and 40 m. s. of the city of that name, is picturesquely situated between two hills. Pop. 17,000. The neighboring territory is famous for its apricots and its breed of horses. Lucena is historically interesting, as the scene of the capture (April 21, 1483) of Boabdil, king of Granada.

LUCE'RA (ancient *Luceria*), a t. of southern Italy, in the province of Foggia, is situated on an eminence 10 m. w.n.w. of Foggia. It contains a college, a good museum, a cathedral, and a splendid episcopal palace. A large trade in cheese and cattle is carried on by the inhabitants. Pop. about 13,500. Numerous inscriptions and fragments of ancient sculpture have been found here.

LUCERNE, *Medicago sativa*, a species of medick (q.v.), one of the most valuable of the leguminous plants cultivated for the supply of green food to cattle. It is a native of the s. of Europe, and has been cultivated there from an unknown antiquity. It is partially naturalized in some parts of Britain. It is not very largely cultivated in Britain, although in some places very successfully, chiefly in the s. of England; but the climate of Scotland is not too cold for it, and the different results obtained by farmers who have tried it seem to depend chiefly on differences of soil and management. It is largely cultivated in some parts of North and South America, and in Peru with great success both on the coast, in all the heat of a tropical climate, and on the mountains to a height of more than 11,000 ft. above the sea; flourishing, however, only during the moister part of the year in the former situation. It endures great droughts, its roots penetrating very deep into the ground; but loves a rich and calcareous soil, and never succeeds on damp soils or tenacious clays. It is a perennial and affords good crops for a number of years. It is sown in rows, at 12 or 14 in. apart, and may be mown several times in a year, growing very quickly after being mown. The quantity of produce is very great, and no other forage plant is ready for use so early in spring. Lucerne has a rather erect stem, leaves with three obovate-oblong toothed leaflets; purplish-blue or sometimes yellow flowers in many-flowered racemes, and pods twisted two or three times round. It ought to be mown before it comes into flower, as it then becomes more fibrous, and less succulent and nutritious.

LU'CERNE, a canton in the center of Switzerland, with an area of about 577 sq.m., and a pop. in '70 of 132,338, showing a slight increase since '60. The soil is generally fruitful, and much grain and fruit are produced. In the more mountainous parts, the rearing of cattle is carried on to a greater extent than anywhere else in Switzerland. The highest elevation attained by the Alps in this canton is 6,900 feet. The principal stream is the Reuss, the principal lake that of Lucerne. The inhabitants are mostly of German race and language, and all belong to the Roman Catholic church, except about 4,000 Protestants, to whom the free exercise of their religion was first accorded in 1828. The constitution of Lucerne is a representative democracy; 100 deputies form the great council, whose president bears the title of *Schultheiss* (judge).

LUCERNE, capital of the canton of the same name, is situated on the Reuss, where it issues from the n.w. extremity of the lake of Lucerne. Near the lake, rising from the middle of the Reuss, is an old tower, which is said to have been once a light-house (*lucerna*), whence the name of the town. The arsenal is one of the most important in Switzerland, containing many old weapons used at the battle of Sempach. Lucerne has a theater, a public library, with a collection of natural history, manufactures of silks, cottons, flax, hemp, gloves, etc. Pop. '70, 14,524.

LUCERNE, LAKE OF, called also the *Lake of the Four Forest Cantons* (Uri, Unterwalden, Schwyz, and Lucerne), because its shores are formed by these, is one of the most beautiful sheets of fresh water in Switzerland or Europe. Length from Lucerne to Flüelen, about 22 m.; average breadth, about 1½ miles. The chief places on its banks are Lucerne, Küssnacht, and Alpnach at the n.w., and Flüelen near its s.w. extremity. It is navigated by several steamboats.

LUCERNE, ANNE CÉSAR, Chevalier de la. See LUZERNE.

LU'CIAN, a classic satirist and humorist of the first merit, was b. at Samosata, in Syria, in the earlier part of the 2d c., though the exact year is matter of conjecture. He himself tells us, in a piece called *The Dream*, that his parents were poor, and could not afford him a learned education. He was, in consequence, apprenticed to an uncle who was a statuary, in order that he might learn that trade; but he soon abandoned it, and betook himself to the study of letters. For a long time he led a somewhat vagrant and unsettled life, visiting the most of Greece, Italy, and Gaul, in the last of which countries he practiced with great success as a teacher of rhetoric. He is thought to have returned to his native country when about 40 years of age, after which time all his masterpieces were composed. The last thing we know about him is, that he was made a procurator of part of Egypt by the emperor Commodus. He died probably about the end of the 2d century. The statement of Suidas, that Lucian was torn to pieces by mad dogs on account of his impiety, finds no credence with modern scholars; neither does that of Volaterranus, that he was an apostate from Christianity. The dialogue entitled *Philopatris*, long attributed to Lucian, certainly shows an intimate knowledge of Christianity; but no critic now believes it to be a production of that writer. The fact is, Lucian was one of that class of men who do not readily embrace any form of religion—men whose sharp critical eyes see too many flaws to make it easy for them to acquire a pious or reverential spirit. In philosophy, as well as in religion, he called no man master. Philosophers are, indeed, the constant subjects of his humorous ridicule and pungent wit, aided by all the resources of a richly inventive fancy. His writings have been classified under seven heads: 1. The Rhetorical; 2. The Critical; 3. The Biographical; 4. Romances; 5. Dialogues; 6. Miscellaneous; 7. Poems. Of these, the most celebrated are his Dialogues, the principal of which are: *The Sale of Lives; Dialogues of the Gods; The Fisherman, or the Revivified; The Banquet, or the Lapithæ; Timon the Misanthrope; Dialogues of the Dead;* and *Icaro-Menippus, or Above the Clouds.* The

best of his romances, and a work of Rabelaisian humor, is his *True Histories*. The *editio princeps* of Lucian appeared at Florence in 1496; the best of the later editions is that commenced by Hemsterhuis in 1730, and finished by Reitz (Amst., 1743). Lucian has always been a great favorite with scholars, and has been translated into most of the European languages. The best English version (incomplete, however) is that of Dr. Franklin (2 vols., Lond., 1780, and 4 vols., Lond., 1781).

LUCIAN, SAINT, a presbyter of Antioch, said to have been b. at Samosata. Left an orphan at the age of 12, he removed to Edessa, where he was baptized, and became a pupil of the eminent biblical scholar, Macarius. Entering the ministry at Antioch, he founded and conducted a theological school. He became greatly celebrated as an ecclesiastic and biblical scholar. In the reign of Diocletian, by order of Maximin, he was arrested in Antioch, transported to Nicomedia, tortured, and put to death in prison. He was buried at Helenopolis, in Bithynia. Ecclesiastical writers mention him as a man of great learning and piety. Eusebius calls him "a person of unblemished character;" and Chrysostom, on the anniversary of his martyrdom, pronounced a panegyric which is still extant. Jerome says that "Lucian was so laborious in the study of the sacred writings that, in his own time, some copies of the Scriptures were known by the name of Lucian;" and that his "revision of the Septuagint version of the Old Testament was generally used by the churches from Constantinople to Antioch." Jerome speaks of him as also the author of several epistles and theological tracts. In the ecclesiastical history of Socrates is an extant confession of faith drawn up by Lucian. There has been dispute respecting his views of the Trinity, some charging him with Arianism, and even maintaining that he was the founder of Arianism, Arius acknowledging himself as his disciple. Certain it is that he was excluded from the church for heresy by three successive bishops of Antioch. But he was afterwards restored, and was greatly honored for his learning and piety. After his death he was enrolled in the calendar of the church as a saint and martyr.

LUCIANISTS, a religious sect, deriving their name either from Lucian, a presbyter of Antioch, whose theological views were Arian, or from Lucian, a follower of Marcion, the author of numerous forgeries and whose theological views were heretical. He is termed by Epiphanias, Lucian *the elder*. It is conjectured that those who first took the name of Lucianists were disciples of Lucian the Marcionite, and that afterwards it was applied to those who adopted the tenets of Lucian the presbyter of Antioch.

LUCID INTERVAL. What intermission is to certain fevers, a lucid interval is to certain forms of mental disease. Those forms in which it occurs are characterized by exaltation or perversion, and not by impairment of the faculties or feelings. There may thus be a cessation or suspension of the fury in mania; there cannot be repair or enlightenment of the obscurity in idiocy or senile dementia. It may consist in the mere substitution of clearness and calmness for violence and confusion; in the occasional recognition of his actual condition and external relations by the lunatic; or in the re-establishment of intelligence and natural feeling so perfect and complete as to differ from sanity solely in the want of permanence. The duration is likewise sometimes so considerable and regular as to divide the mental and moral life of the individual into two halves. It has been believed that even in such cases the interval is a part or link of the disease, and that there invariably exists an under-current of unsoundness. It is found to be extremely difficult to distinguish this state from real and trustworthy restoration to reason, except by reference to duration. Practically and legally, these conditions have been held to be identical. A will executed during a lucid interval, although that was extremely transitory, and although the testatrix unloosed the straps by which her hands had been confined, in order to execute the document, has been held to be valid; all that appears to be required, under such circumstances, is to prove that the conduct of the individual bore the aspect of rationality and health. It has been observed that, immediately before death, a small proportion of the insane regain lucidity, and, after years of extravagance and absurdity, die in possession of comparative sense and serenity. This change is supposed to depend upon the failing powers of the circulation.—Burrows, *On Insanity;* Shelford, *On Law of Lunatics*, p. 289.

LUCIFER, or PHOSPHORUS, the name applied by the classics to the planet Venus when it is a morning star; also employed to designate the king of Babylon in a passage of Isaiah (xiv. 12), which has been misconstrued into a reference to Satan. Following is the passage in question: "How art thou fallen from heaven, O Lucifer, son of the morning! How art thou cut down to the ground, which didst weaken the nations!" Of the mistaken rendering of this passage, Kitto says: "Tertullian and Gregory the great understood this passage of Isaiah in reference to the fall of Satan; in consequence of which the name Lucifer has since been applied to Satan."

> How wretched
> Is that poor man that hangs on princes' favors.
>
> When he falls, he falls like Lucifer,
> Never to rise again.—*Shakespeare, Henry VIII.*

In the Roman mythology Lucifer was the son of Astræus and Aurora, and was charged with the care of the chariot and horses of the sun, fulfilling this duty in company with the

Hours. Milton, with Shakespeare and other writers, adopts the error of the fathers in his *Paradise Lost*, giving to the fallen archangel the name Lucifer. The fact that the Latin and Greek roots of the words lucifer and phosphorus translate into the same meaning of "light bringer," has caused the application of the term lucifer matches, these articles being tipped with phosphorus.

LUCIFER, b. Sardinia; d. about 370; bishop of Cagliari, in Sardinia, and known first in history as a zealous opponent of Arianism. In 354 he was sent by Liberius, bishop of Rome, with Eusebius of Vercelli to defend Athanasias at the council of Milan, for which he was for a time imprisoned, and then banished by the Arian emperor Constantius. At Eleutheropolis, in Syria, he composed his chief work, *Ad Constantium Augustum pro Sancto Athanasio*. In consequence of his bold and vehement invective he was sent to Egypt. Released from exile on the death of Constantius, he was commissioned by the council of Alexandria to heal the divisions in the church of Antioch, which arose from the supposed Arianism of Meletius, its bishop. But he widened the schism by ordaining Paulinus to the see, for which he was rebuked by his friends. Chafing under the rebuke and displeased with the decree of the council of Alexandria readmitting the adherents of Arianism, he retired in 363 to his native island of Sardinia and founded a sect called Luciferians, whose distinguishing tenet was that no Arian should be received into the church. He died about 370. Besides the work mentioned, he published *Epistola ad Eusebium; De non Conveniendo cum Hæreticis; De Regibus Apostolicis; De non Parcendo in Deum Delinquentibus; Moriendum pro Filio Dei; Epistola ad Florentium Magistrum Officiorum; Epistola ad Catholicos*. These works, distinguished by an acrimonious spirit, are valuable chiefly for the scriptural quotations which they contain.

LUCIFER MATCHES. See MATCHES.

LUCILIUS, CAIUS, B.C. 148–103; b. Suessa Aurunca (Sessa), n.w. part of Campania, Italy. He was of the equestrian order, and the maternal grand-uncle of Pompey the great. In his 16th year he served under Scipio Africanus at the siege of Numantia. He is generally considered the inventor of satirical composition, at least of that form adopted by Horace, Perseus, and Juvenal. His satires were popular in the Augustan age, and to him Horace, Juvenal, and Perseus seem to have been indebted for their best thoughts and expressions. His style was distinguished by great energy of expression, but deficient in elegance and clearness. He attacked vice with great severity. He was on intimate terms with Lælius and Scipio. His works consist of 30 satires, a comedy, epodes, and hymns, none of which are extant except 800 fragments of his satires, the longest of which has only 13 verses. These have been collected and published by R. and H. Stephens in their *Fragmenta Poetarum Veterum Latinorum*. He wrote also the *Life of Scipio the Elder*.

LUCINA, in Roman mythology, the surname of Juno as the goddess of light, and especially as the deity who presided over the birth of children—the bringing them to light: from *lux, lucis*, "light." This is also the name of a goddess in Egyptian mythology, supposed to have exercised special charge over upper Egypt.

LUCI'NA, a genus, and LUCINIDÆ, a family of lamellibranchiate mollusks, allied to *veneridæ* (see VENUS). The shell is orbicular, or nearly so, and bears a very long impression of the anterior muscle. The animal has a long, generally cylindrical foot. The species are numerous, are found in almost all seas, and at all depths in which life is known to exist, burrowing in the sand or mud. There are also many fossil species in the more recent formations.

LÜCKÉ, GOTTFRIED CHRISTIAN FRIEDRICH, D.D., 1792–1855, b. Egeln, in the duchy of Magdeburg; studied theology two years at Halle under Knapp and Gesenius, and at Göttingen under Planck. Here he became known from his prize essay, *De Ecclesia Apostolica*. This work procured for him an important office in the theological faculty, and brought him into close literary intercourse with Bunsen, Ernest Schulze, Brandis, Lachmann, and other scholars. In 1817 he published his *Grundriss der Neutestamentlichen Hermeneutik*. In 1818 he was made extraordinary professor of theology at Bonn, and devoted himself with enthusiasm to the study of exegesis and church history. He contributed to the *Theologische Zeitschrift* and *Christliche Zeitschrift*, and began his *Commentary on the Writings of John*. He wrote biographical notices of Planck, Schleiermacher, De Wette, and many others, and during the conflict with Strauss he wrote a tract entitled *Strauss und die Züricher Kirche*. In 1827 he became professor of theology at Göttingen. He excelled greatly as a commentator, and did much to check the influence of rationalistic criticism.

LUCKENWAL'DE, a t. of Prussia, government of Potsdam, and capital of a circle of the same name, is situated on the river Nuthe, 30 m. s.s.w. of Berlin. Pop. '75, 13,816. One of its suburbs, called Little Gera, is inhabited by Russian colonists. Its cloth manufactories are among the largest in Prussia. Luckenwalde is a station on the Berlin and Anhalt railway.

LUCKNER, NICOLAUS, 1722–94, b. Bavaria; entered the Prussian service, and distinguished himself in the seven years' war. He joined the French army, with the rank of lieut.gen., in 1763. In 1791 he was made a marshal, and in 1792 took command of the

troops in the n. of France, and captured Courtrai which he soon abandoned, and withdrew to Lille. Taking command of another force he defeated the Austrians near Valenciennes; but soon after was replaced by Kellermann, and was reprimanded by the convention. In 1793 his pension was taken away from him, and in January of the next year he was guillotined.

LUCKNOW', the capital of Oude, in British India, stands on the right or s.w. bank of the Gumti, by which it has a navigable communication upwards for many miles, and downwards all the way to the Ganges. It is in lat. 26° 52′ n., and long. 81° e., is 360 ft. above the sea, and is 610 m. from Calcutta. The place is connected with the opposite side of the river by three bridges, one of stone, another of boats, and a third of iron. Though Lucknow does not appear to contain any very ancient buildings, it is yet understood to be older than any one of the other great cities of India, claiming to have been founded by Lakshmana, brother of Rama. The middle portion, which may be said to represent the original town, contains, with the exception of a few brick-houses, little but mud walls and straw roofs. On either side of these central hovels are the handsomer sections of Lucknow, generally dating, however, no further back than 1775. The population in 1871–72 was 284,779. As an illustration at once of manners and of government, all classes, down to the annexation of Oude in 1856, were wont to go fully armed, the very shop-keepers being equipped with swords and shields. In connection with the mutiny of 1857, Lucknow stood foremost in point of interest, surpassing every spot in the energy and obstinacy of its defense against the insurgents, and almost equaling Delhi itself in the grandeur and brilliancy of the operations, which recovered it, after a temporary abandonment, from the rebels.

LUÇON, a t. in France, in the department of La Vendée, arrondisement of Fontenai; pop. 6,603. It is a gloomy town, situated on the eastern edge of the Fens, and at the extremity of the Luçon canal, which connects it with the bay of Aiguillon, and is navigable for vessels of 60 tons. It contains a diocesan seminary, and gives title to a bishop. It has manufactories of porcelain.

LUÇON, or LUZON. See PHILIPPINE ISLANDS, *ante*.

LUCRE'TIA, a Roman matron, daughter of Lucretius and wife of Collatinus, celebrated for her virtue and beauty. Having been outraged by Sextus, son of Tarquinius Superbus, king of Rome, she made her father and husband swear to avenge her wrong, and then stabbed herself, B.C. 509. The bloody poniard and her dead body, being exposed to the senate were the signal of a revolution, which led to the expulsion of the Tarquins from Rome and the establishment of the republic.

LUCRE'TIUS, TITUS CARUS. Of the life of Lucretius we know almost nothing with certainty, as he is mentioned merely in a cursory manner in contemporary literature. Hieronymus (340–420 A.D.), in his translation of the chronicle of Eusebius (264–340 A.D.), gives the date of his birth as 95 B.C. (according to others, 99); but he does not specify the source from which his statement is derived. It is alleged, further, that he died by his own hand, in the 44th year of his age, having been driven frantic by a love-potion which had been administered to him; that he composed his works in the intervals of his madness; and that these works were revised by Cicero. Donatus (Life of Virgil), on the contrary, affirms that his death occurred in 55 B.C., on the very day on which Virgil assumed the *toga virilis*. The stories of the philter, the madness, the suicide, and the revision of the works by Cicero, rest on very insufficient authority, and must be received with extreme caution. The peculiar opinions advanced by Lucretius would render him specially obnoxious to the early Christians, and it is possible that the latter may have been too easily led to attribute to him a faith which, in its mysterious nature and melancholy termination, was deemed but a due reward for the bold and impious character of his teachings. The great work on which the fame of Lucretius rests is that entitled *De Rerum Natura*, a philosophical didactic poem in six books. It is dedicated to C. Memmius Gemellus, and was published about 56 B.C. Lucretius was a reverent follower of the doctrines of Epicurus (q.v.), and his poem is in large measure an exposition of the physical, moral, and religious tenets of that philosopher. The great aim of the poet was to free his fellow-countrymen from the trammels of superstition, and to raise them above the passions and the weaknesses of our natural condition. With his master, Epicurus, Lucretius adopted the atomic theory of Leucippus, which taught that certain elementary particles, existing from all eternity, and governed by fixed laws, combined to form the universe of matter; that the existence and active interference of a supreme overruling deity was not necessary to be supposed in order to account for the marvelous and abnormal in nature; and that whatever *appeared* to be miraculous was, in reality, not so, but was merely the result of certain fixed laws, which operated with unerring precision, and in a natural process. Regarded merely as a literary composition, the work of Lucretius stands unrivaled among didactic poems. The clearness and fullness with which the most minute facts of physical science, and the most subtle philosophical speculations, are unfolded and explained; the life and interest which are thrown into discussions in themselves repulsive to the bulk of mankind; the beauty, richness, and variety of the episodes which are interwoven with the subject-matter of the poem, combined with the majestic verse in which the whole is clothed, render the

De Rerum Natura, as a work of art, one of the most perfect which antiquity has bequeathed to us. For a fuller estimate of Lucretius and his poetry, see prof. Sellars's essay in *The Roman Poets of the Republic* (Edin., 1863). The *editio princeps* of Lucretius was published at Brescia about 1473; only three copies are known to exist. The best editions of Lucretius are by Wakefield (Lond., 1796, 3 vols. 4to, and Glas., 1813, 4 vols. 8vo); by Forbiger (Leip., 1828, 12mo); by Lachmann (Berlin, 1850, 2 vols.); and by prof. Munro (3d edition, 1870). The *De Rerum Natura* has been translated into English verse by Thomas Creech (Lond., 1714, 2 vols. 8vo); and by John Mason Good (Lond., 1805–7, 2 vols. 4to); into English prose by the rev. J. S. Watson, M.A. (Lond., Bohn's classical library, 1851, post 8vo); and by prof. Munro, at the end of his edition.

LUCUL'LUS, L. LICINIUS, a very distinguished Roman general, b., it is conjectured, about 110 B.C. In the first Mithridatic war, he commanded the fleet as legate of Sulla. In 77 B.C. he filled the office of prætor, and immediately after held the administration of the province of Africa. In 74 B.C. he was chosen consul along with Marcus Aurelius Cotta, and got Cilicia for his province, whilst Cotta had Bithynia. Both consuls arrived in Asia about the close of 74 B.C. Cotta was soon after utterly defeated by Mithridates, who had burst into Bithynia at the head of 150,000 troops, forced to take refuge in Chalcedon, and there was besieged by the victor. Lucullus, however, advanced to his relief at the head of 35,000 men, compelled Mithridates to raise the siege, and almost annihilated his army on its retreat. In 71 B.C. Pontus became subject to the Romans. The measures which Lucullus now introduced in the government of the province of Asia, to secure the provincials against the fearful oppressions and extortions of farmers of the taxes and usurers, especially his fixing a uniform and moderate rate of interest for all arrears, show that he was a just, wise, and humane administrator; but though the cities of Asia were grateful for his clemency, the equestrian order in Rome (who had the farming of the taxes) became implacably hostile to him, and his own troops grew disaffected on account of the strictness of his discipline. For some time, however, things seemed to go on well enough. In the spring of 69 B.C. he marched into Armenia with a small force of 12,000 foot and 3,000 horse, and gained a complete victory over Tigranes, at the head of an army of 220,000 men. In the following year he gained another great victory at the river Arsanias over a new army led against him by Tigranes and Mithridates; but the mutinous spirit of the legions—in spite of these splendid triumphs—daily increased. Lucullus now wanted to besiege Artaxata, the capital of Armenia, but the soldiers refused to advance further. After this he could do nothing; not a soldier would serve under him. At last, he was superseded by Pompey, and left Asia 66 B.C. The cabals of his enemies so much prevailed against him that he was three years in Rome before he obtained his triumph. In conjunction with the aristocratical party, he attempted to check the increasing power of Pompey, and the attempt caused the coalition known as the first triumvirate. But he was ill fitted to act as leader against such unscrupulous men, and soon withdrew altogether from political affairs. During his public career he had acquired (but not unfairly) prodigious wealth; and he spent the remainder of his life surrounded by artists, poets, and philosophers, and exhibiting in his villas at Tusculum and Neapolis, and in his house and gardens at Rome, a luxury and splendor which became proverbial. A single supper—on particularly grand occasions—would cost him 50,000 denarii (£1770). Towards the close of his life, his faculties began to decay, and his property was placed under the management of his brother. He died about 57 B.C. Lucullus was a man of great military talent, humanity, liberality, and love of justice; his great fault was his love of pleasure; not exactly vicious pleasure, for he was an epicure rather than a profligate; yet so purely sensual that it seems to have made people—certainly his soldiers—believe him to be grossly selfish and unsympathetic.

LUDEN, HEINRICH, 1780–1847; b. Germany; educated at Göttingen, and from 1806 till his death professor of history at Jena. He wrote a *History of Antiquity; History of the Middle Ages;* and *History of the German People*, the latter covering the period down to 1237.

LU'DENSCHEID, a t. of Prussian Westphalia, 33 m. n.e. from Cologne, in a mountainous district, not far from the right bank of the Volme, a branch of the Rhine. It has cotton-mills, and manufactures of cutlery, buttons, files, and other articles of hardware. There are calamine mines in the neighborhood. It has of late increased rapidly in population and prosperity. Pop. '75, 8,567.

LÜDERS, ALEXANDER NIKOLAYEVITCH, Count, 1790–1874; b. Russia; of German descent. Entered the Russian army in 1807, and served through the war with France. He participated in the Polish campaign, was present at the capture of Warsaw, and commanded a force in the Caucasus from 1843 to 1845. He invaded Transylvania in 1849, and in the Crimean war held a command which he was forced to resign on account of ill-health. He assumed command over Poland in 1861, and for his services in restoring order in Warsaw was created count. The same year an unsuccessful attempt was made to assassinate him.

LUD'INGTON, a city in w. Michigan, organized 1867; a terminus of the Flint and Père Marquette railway, connected with Milwaukee by two lines of steamers; pop. '74,

2,500. It is situated on lake Michigan at the mouth of the Marquette river, which a few miles above enters a narrow gulf, of its own name, flowing through it to the lake. It has several manufactories of lumber and shingles, carriage factories, and machine shops; tan-bark is one of its commodities. Its inhabitants depend largely on the fisheries and an inland farming district. It is 137 m. w. of East Saginaw, 54 m. n.w. of Muskegon, 84 m. from Milwaukee, and 125 m. w. of Lansing. It has 2 banks, 4 churches, a convenient harbor, 2 newspapers, 8 hotels, and a fine public school-house.

LUDLOW, a municipal and parliamentary borough of England, in the county of Salop, at the confluence of the Corve and Teme, 25 m. s.s.e. of Shrewsbury. It is an old and very interesting town; its parish church dates from the reign of Edward III.; its free school, founded by Edward IV., has an annual income of £350. The castle, now a magnificent ruin, was at one time one of the most important strongholds against the Welsh. Here Arthur, eldest son of Henry VII., celebrated his marriage with Catharine of Aragon, afterwards the wife of Henry VIII.; and here, in 1634, Milton's mask of *Comus* was performed for the first time. Ludlow returns one member to parliament. Pop. '71 of parliamentary borough, 6,203; of municipal borough, 5,087. It has been represented in parliament since the reign of Edward IV.

LUDLOW, EDMUND, 1620–93; b. Maiden-Bradley, Wiltshire, Eng.; was educated at Oxford; joined the parliamentary army under Essex as a volunteer, and was at the battle of Edgehill in 1642. After the death of his father he entered parliament for Wiltshire, and obtained command of a regiment of cavalry. He was an ardent republican, denounced the misgovernment of the king, advocated the establishment of a commonwealth, and supported the bill for the abolition of the house of peers. He was one of the judges of Charles I. His independence rendered him obnoxious to Cromwell, who sent him after the death of Charles to Ireland in 1650 with a military command. When Cromwell assumed the authority of protector, Ludlow vigorously protested against it, being in favor of a republic. Returning to England he refused unqualified submission to Cromwell. Distrusted on account of this refusal, security was required that he would not oppose the government, which being privately furnished by his brother Thomas, Ludlow retired into Essex, where he resided till Cromwell died. He then returned, was active in parliament, and endeavored to restore the commonwealth. On the restoration of Charles II., feeling himself insecure, he fled the country in 1660, landed at Dieppe, and then went to Switzerland, taking up his residence at Vevay. Wearied with exile, he returned in 1689, when, being threatened with arrest for participating in the murder of Charles I., he again fled to Vevay, where he died. Over the doorway of his house he had placed the inscription, *Omne solum forti patria.* Here he wrote his *Memoirs* in 3 volumes.

LUDLOW, FITZHUGH, 1837–70; b. Poughkeepsie, N. Y.; entered upon the life of an author when only 18 years old, and two years later published *The Hasheesh Eater*, which achieved immediate popularity. He next became known as a sketch and story writer, contributing freely to *Harper's Monthly* and other leading magazines; and, having made a western tour, gave an account of his experiences and of the states and territories visited in a work entitled *The Heart of the Continent.* He also wrote *The Opium Habit*, a book describing the insidious inroads of the drug on the constitution and *morale* of those habituated to its use, and designed to be a warning against acquiring the habit. Ludlow was unfortunately himself a victim to the "opium habit," a fact which seriously invaded his literary capacity, naturally of excellent quality. He had an exuberant fancy, a brilliant flow of language, and graphic descriptive powers. The last few months of his life were spent in Switzerland, where he died, every effort being made by loving attention to redeem his shattered constitution.

LUDLOW, ROGER, b. England, and settled at Dorchester, Mass., in 1630. After serving for 4 years as one of the assistants, being disappointed in his ambition to be governor, he settled with other Massachusetts emigrants at Windsor, Conn., in 1635, and for the next 19 years was chosen either deputy-governor or a magistrate. In the meantime he had taken up his residence at Fairfield, by whose inhabitants he was appointed, in 1654, to conduct a proposed Indian campaign; but this failing to receive the sanction of the general court, Ludlow left Connecticut for Virginia. The time of his birth and death are unknown. During his residence in Connecticut he compiled for the colony its first law code, which was published in 1672.

LUDLOW FORMATION, the uppermost division of the silurian strata (q.v), consists of an extensive series of indurated argillaceous beds, with bands of dark-gray argillaceous limestone. The town of Ludlow stands upon the higher strata of this formation.

LUDOLPHUS, or LUDOLF, JOB, 1624–1704; b. Erfurt, Thuringia; educated at Leyden, studying specially law and the oriental languages. After leaving Leyden he was successively tutor to the sons of the Swedish ambassador at Paris, and to the children of the duke of Saxe-Gotha at the court of the duke. He spent the latter part of his life at Frankfort-on-the-Main, where he was made president of the academy of history. He was one of the most eminent oriental scholars of his age. In 1649 he visited Rome and mastered the Ethiopic language by the aid of an Abyssinian whom he met. In 1661 he published a dictionary and grammar of this language. He learned also the

Amharic language, of which he published a dictionary and grammar. His other most important works are: *Historia Æthiopica; Ad suam Historiam Æthiopicam Commentarius; Relatio Nova de hodierno Habessiniæ statu ex India nuper allata; Appendix contineus Dissertationem de Locustis.*

LUDWIG I., KARL AUGUST, King of Bavaria, the eldest son of king Maximilian Joseph, b. Aug. 25, 1786. In 1810 he married the princess Theresa of Saxe-Hildburghausen. As crown-prince, he took little part in politics, but devoted himself to science and the fine arts, and lived very economically, in order that he might be able to spend large sums in forming a magnificent collection of masterpieces of sculpture, known as the glyptothek. He succeeded to the throne on Oct. 13, 1825, and commenced his reign by granting some reforms. His reign was distinguished by the encouragement of the fine arts, and the erection of magnificent public buildings; he also inaugurated the first railway that Germany possessed—that from Nuremberg to Furth—and executed the fine canal called *Ludwigskanal*, which unites the Danube and the Main. But it was no less characterized by the prevalence of ultramontane influence, intolerance toward all who did not belong to the church of Rome, and contempt of constitutional rights and forms, whilst the king's conduct gave great occasion of scandal, particularly in his connection with the dancer Lola Montez (created countess of Landsfeld). On account of the revolutionary disturbances in Feb. and Mar., 1848, Ludwig resigned the crown in favor of his eldest son, Maximilian. He died in 1868.

LUDWIG II., King of Bavaria, b. Aug. 25, 1845; succeeded his father, Maximilian II., Mar. 10, 1864. He is a bachelor and quite eccentric in his habits as a monarch, showing himself infrequently to his subjects, and being devoted as much to art, especially music, as to the cares of government. He took the side of Prussia in the late war with France, and favored the unity of Germany under the imperial rule of William I. His intimacy with Richard Wagner, the musical composer, in the first years of his reign, excited the opposition of the people to such an extent that the king was obliged to send him away from the court. He follows his own caprices rather than the guidance of any political party. He loves the solitude of his magnificent palaces, where he devotes much time to music and theatricals.

LUDWIG, KARL FRIEDRICH WILHELM, b. Germany, 1816; educated at Erlangen and Marburg, and made professor of comparative anatomy at the latter in 1849. He held the chair of physiology at Zürich, 1849–55; at Vienna, 1855–65; and in the latter year was called to the same position in Leipsic. He had made a specialty of anatomical physiology, and has published, besides his contributions to scientific journals, *Lehrbuch der Physiologie des Menschen*, and *Arbeiten aus der Physiologischen Anstalt zu Leipzig.*

LUDWIG, OTTO, 1813–65; b. Germany. Obliged by ill-health to give up music, which he had studied under Mendelssohn, he turned his attention to literature, and produced a number of tragedies and stories: *Der Erbförster* (1853), *Die Makkabaer* (1855), *Zwischen Himmel und Erde* (1856). *Reden oder Schweigen* and *Shakespeare Studien* were published after his death.

LUD'WIGSBURG, a t. of Würtemberg, about 8 m. n. of Stuttgart. It was founded in 1706 by duke Eberhard Ludwig, in consequence of a quarrel with the Stuttgarters, and is the second royal residence. Ludwigsburg was laid out with painful regularity, and has an artificial and lifeless look. It is the principal depôt for soldiers in Würtemberg, not less than 4,000 being stationed here, whence it has got the name of the Swabian Potsdam, and has an arsenal, a cannon-foundry, a military academy, and a royal castle, with splendid picture-gallery and gardens. Pop. '75, including military, 14,709.

LUD'WIGSHAFEN, a t. in Rhenish Bavaria, opposite Mannheim, on the Rhine; pop. 12,093. It is a fortified town, and was founded by Louis I. of Bavaria in 1843. The river is crossed at this point by an iron bridge, and there is considerable commerce.

LUFF, in nautical parlance, is to bring a ship's head to the wind, preparatory to tacking, or otherwise. The *luff* of a vessel is the roundest part of her bow.

LUGARD, Sir EDWARD, b. 1810; educated at the military college in Sandhurst (England); entered the British army as an ensign in 1828, and served many years with distinction in India. He was in the Afghan war of 1842, in the campaign on the Sutlej, in that of the Punjab, and in the Persian expedition of 1857, being promoted successively to be assistant adjt.gen., adjt.gen., chief of staff, maj.gen., lieut.gen., and gen. He was made permanent under-secretary of war in 1861, and president of the army purchase commission and member of the privy council in 1871; K.C.B. in 1857, and G.C.B. in 1867.

LUGA'NO, a t. in the canton of Ticino, Switzerland, stands on the n.w. shore of the lake of the same name. It is entirely Italian in character, with dingy and dirty arcaded streets; but its environs display all the richness of Italian scenery. Lugano contains several factories for throwing silk, and is the seat of a flourishing transit trade between Switzerland and Italy. From *Monte Salvadore*, in the vicinity, a magnificent view may be obtained. Pop. '70, 6,024.

LUGANO, LAKE OF, is situated on the s. of the canton of Ticino, Switzerland, three of its arms reaching into the Italian territory. Its greatest length is about 20 m.; but

from its exceedingly irregular shape, it is nowhere more than 1¼ m. broad. The character of its scenery, though perhaps as beautiful, is more rugged than that of lakes Como and Maggiore.

LUGANSK', a market t. in the government of Ekaterinoslav, European Russia, situated on the Lugan, a branch of the Donetz, 100 m. n.n.w. of Taganrog, is the seat of the only iron-works in the s. of Russia. The ore was formerly brought from the Ural mountains, but is now found in sufficient quantity in the neighborhood. Lugano has also a cannon-foundry and coal-mines, and, during the Crimean war, supplied the Russian fleet with coal and ammunition. Pop. '67, 10,290.

LUGDUNUM. See LYONS, *ante.*

LUGGAGE of travelers, though, in a certain sense, attached to the person, and under one's immediate care, and not paid for separately, is nevertheless protected by the contract; and carriers of all kinds are bound to carry luggage safely, and if it is lost, must pay damages for it. Owing to the established rule, that luggage is not paid for separately, it has often been attempted by travelers to abuse this privilege, and carry merchandise as part of and mixed up with their luggage, in order to escape any separate and extra payment. Most railway companies, accordingly, by their by-laws fix a limit as to weight for this luggage, and it is presumed that luggage consists only of wearing-apparel or things for personal use, and not articles of trade intended for sale. Though carriers or railway companies cannot get rid of liability for this luggage by giving any notice or making a by-law to that effect, yet it is competent for all carriers to specify certain articles of merchandise, which, whether they are mixed up with luggage or not, must be separately paid for, otherwise they will not be responsible. Such are gold or silver in a manufactured state, jewelry, watches, clocks, trinkets, stamps, maps, writings, title-deeds, paintings, pictures, glass, china, silk, furs, and lace, provided these exceed in value £10. Unless notice of such articles being included in the luggage is given to the carriers or company, and an increased rate paid, they will not be responsible for the loss. Except, therefore, these excepted articles, the carrier is bound to receive, carry securely, and deliver the luggage of travelers, notwithstanding the traveler has it in his personal charge. Thus, a railway porter, on the arrival of the train, having carried a traveler's luggage to a cab and lost it in the way, the railway company was held responsible. A carrier has a lien on the luggage for the fare, if not paid, and can keep it till such fare is paid; but as prepayment is now the universal practice, this remedy is seldom resorted to.

LUGGER, a small vessel carrying two or three masts, with a lugsail (see below) on each, and occasionally a topsail. The rigging is light and simple, and the form of the sails enables a lugger to beat close up to the wind. Among English boats, the lug-rig rarely extends beyond the larger class of fishing-vessels, though there are some very elegant lugger yachts in the different clubs. In the French service, however, it is a favorite rig, and is used for vessels of sizes as large as British schooners.

LUGSAIL, a quadrilateral sail used in luggers and open boats. It is bent, by the upper side, upon a straight yard, which is slung on the mast in an oblique position, one-third to windward, two-thirds on the leeward side of the mast.

LUGO, a province of Spain, in Galicia, on the Atlantic coast, between long. 6° 52′ and 8° 4′ w.; 3,484 sq.m.; pop. 474,286. In the n. part it has a mountainous surface, with mines of lead and iron; the southern part is level and fertile, and produces fruits, wine, and wheat.

LU'GO (the *Lucus Augusti* of the Romans), a t. in the n.w. of Spain, capital of the province of the same name, is situated on the left bank of the Miño, 50 m. e.n.e. of Santiago. It is the seat of a bishop, has a cathedral of the 12th c., and several other churches, and manufactures of silk and leather. It was celebrated in the time of the Romans for its warm sulphur-baths. Pop. 9,000.

LU'GO, a t. of central Italy, in the province of Ravenna, 32 m. s.e. from Ferrara. It is supposed to be the site of the ancient *Lucus Dianæ.* Lugo is an important provincial town. There is an annual fair which lasts from the 1st to the 19th of Sept., and is the occasion of a great concourse. Lugo has a very considerable trade in hemp, flax, rice, wine, brandy, etc. Pop. about 8,500.

LU'GOS, a market t. of the Austrian empire, in the Banat, on the Temes, a branch of the Danube, 32 m. e.s.e. from Temeswar. It consists, strictly speaking, of two contiguous towns, the inhabitants of the one, DEUTSCH-LUGOS, being mostly of German race, and those of the other, ROUMANISCH-LUGOS, or WALLACHISCH-LUGOS, being Roumanian. Pop. of former, '69, 3,350; of latter, 8,304.

LUG-WORM, or LOB-WORM (*arenicola piscatorum*), one of the *dorsibranchiate annelidæ,* extremely abundant on the British shores, and very valuable as bait to fishermen. It inhabits the sand, on the surface of which, after the tide has retired, innumerable coils are always to be seen, the *casts* of this worm. It is larger than the earth-worm, sometimes a foot long, is destitute of eyes, has no distinct head, but is much thicker at the extremity where the mouth is situated than at the other. The mouth has no jaws, nor teeth, nor tentacles. There are two rows of bristles along the sides, organs of locomo-

tion, by means of which the lug-worm works its way through the sand. About the middle, it has on each side six tufts of gills. When touched, it exudes a yellowish fluid; and an exudation from its body slightly agglutinates the particles of sand, so as to form a tube through which it passes and repasses. It is one of the annelids most remarkable for the red color of the blood, which imparts a fine crimson to the gill-tufts.

LUIGI, ANDREA DI, 1470–1512; b. Italy; known also as L'Ingegno, and Andrea d'Assisi. He was a pupil of Perugino, with whom he worked on the Cambio at Perugia. Little is known of his work, but a coat-of-arms in the Assisi town-hall is ascribed to him.

LUINI, or **LOVINO DA LUINI**, BERNARDINO, b. about 1460 at Luini, near the Lago Maggiore, a celebrated painter of the Lombard school. He is generally stated to have been the principal pupil of Leonardo da Vinci, but it rather appears that he was educated under Stefano Scotto; and though, from having attended the academy of the fine arts founded at Milan by Ludovico il Moro, of which Leonardo was director, he may be styled a pupil of that great artist, yet it is not proved that he received any direct instruction from him. Though Luini occasionally imitated the style and execution so closely as to deceive experienced judges, his general manner had a delicacy and grace sufficiently original and distinct from that of Leonardo. Still, the works of the former are often attributed to the latter, in order to increase their value. He executed numerous works at Milan in oil and fresco. His frescos at Lugano, Saronno, and Pavia are justly admired. The date of his death is not exactly known, but he was alive in 1530.—He had a brother, AMBROGIO, who imitated his style, and several sons who also were painters.

LUISE, AUGUSTE WILHELMINE AMALIE, queen of Prussia, was b. Mar. 10, 1776, at Hanover, where her father, the duke Karl of Mecklenburg-Strelitz, was then commandant. She was married to the crown-prince of Prussia, afterwards Frederick William III., on Dec. 24, 1793. After his accession to the throne, she became exceedingly popular, her great beauty being united with dignity and grace of manners, and with much gentleness of character and active benevolence. This popularity increased in consequence of her conduct during the period of national calamity which followed the battle of Jena, when she displayed not only a patriotic spirit, but no little energy and resolution. She was unexpectedly taken ill, and died on a visit to her father in Strelitz, July 19, 1810. Her memory is cherished in Prussia, and the order of Luise in that kingdom was founded in honor of her.

LUITPRAND, or LIUTPRAND, King of Lombardy. See LOMBARDY, *ante*.

LUITPRAND, or LIUTPRAND, 920–72; b. Italy; chancellor of Berenger II., in whose service he went to Constantinople on a diplomatic mission. Having fallen into disfavor with Berenger, he took refuge with the emperor Otho I., who made him bishop of Cremona. He was for a second time ambassador to Constantinople (968–71), and gives an account of his embassy in his *Relatio de Legatione Constantinopolitana*. He also wrote the history of Otho's reign for the years 960–64, the *Historia Othonis;* and the *Antapodosis*, containing the history of Europe from the death of Charles the fat to about 950.

LUKE (*Lucas*), the author of one of the gospels and of the Acts of the Apostles, was b., according to the accounts of the church fathers, at Antioch in Syria, and is said to have been a physician. He was probably by descent a Hellenistic Jew. We learn from Scripture that he was the associate of Paul in his second evangelistic expedition (52 A.D.); but that is all we know; whatever else is asserted concerning him is doubtful. That he was a painter is one of the things for which tradition vouches; and in the church of St. John Lateran at Rome a picture of our Savior is shown which is ascribed to Luke, but is believed to be a work of the 13th century. The churches of Padua, Venice, and Rome also possess many pretended relics of this evangelist. His festival is commemorated by the Roman Catholic church on Oct. 18.—The gospel of St. Luke, addressed to a certain Theophilus, is generally believed to have been written before the destruction of Jerusalem. Rénan, however, in his *Vie de Jesus* (1863), considers its composition subsequent to that event. The time and place of its origin are unknown. See Schleiermacher's *Die Schriften des Luke* (Berlin, 1817). The apocryphal writings ascribed to Luke are *Acta Pauli; Baptismus Leonis;* and *Liturgiæ XII. Apostolorum*.

LUKE, THE EVANGELIST (*ante*), concerning whom all that is certainly known is drawn from his own writings and those of the apostle Paul. That he was not a Jew by birth is indicated by the fact that the apostle, in the epistle to the Colossians, speaks of him separately from those who were of the circumcision. According to his own statement, he had not been numbered among the first eye-witnesses and ministers of the word. Paul calls him the beloved physician. His name does not occur in the Acts, and his presence with Paul is shown by the change in his narrative to the first person plural. By following the clue thus given we learn that he joined Paul at Troas, went with him, on his first entrance into Europe, to Philippi, and was separated from him when Paul and Silas were imprisoned; did not depart with him from the city, and was not with him afterwards until his third departure from Philippi, when he rejoined him, continued with him till he reached Jerusalem, and went with him into the church there; was apparently separated from him during the apostle's imprisonment at Cæsarea; sailed with him on the voyage to Italy, and, after their shipwreck at Malta, went with him to

Rome, where, during the apostle's first imprisonment, he continued his fellow-laborer, as appears from the epistles to Philemon and the Colossians; and remained to the last faithful to him, when others had forsaken him, as Paul declares in his closing words to Timothy, "only Luke is with me." Tradition tells some other things concerning him which may possibly be true, besides many which certainly are false.

LUKE, GOSPEL OF (*ante*), has occupied the third place in the arrangement of the gospels during all the Christian centuries back to the close of the first. The council of Laodicea, and the historian Eusebius in the 4th c., recognized it as one of the canonical books of Scripture; Origen and Tertullian, in the third, frequently quoted it; Irenæus, 180, acknowledged it as Luke's work; the Muratorian fragment, about 170, assigns it the third place; Tatian, also in the 2d c., constructed his *Diatessaron*, a harmony of the four gospels, the third of which was Luke's. Justin Martyr, in his defense of Christianity, presented to the emperor in 139, quotes as in general use among the churches memoirs of Christ which, it is morally certain, were the four gospels. See JOHN, GOSPEL OF. Clement of Rome, about 100, mentions Luke's gospel as one of the Christian books. These writers say that Luke wrote under the general superintendence of Paul. While this opinion is sustained by the long-continued intimacy and confidence existing between the evangelist and the apostle, Luke says in his preface that, having diligently investigated all things from the very beginning, he wrote out an account of the facts which were already fully believed in the Christian church, and in which Theophilus, for whom he wrote, had been orally instructed. The facts had been spread abroad, first, by the preaching and conversation of those who, from the beginning, were eye-witnesses and ministers of the word; and, secondly, by many written accounts rendered necessary by the increasing number of converts to the Christian faith. Luke's work fully justifies his declaration that he had searched out all things from the beginning, as it gives the genealogy of Jesus back to Adam, narrates the annunciation by the angel to Zacharias and to Mary, and records various facts connected with the birth, infancy, and childhood of Jesus which had probably been furnished by Mary herself.

The contents of the gospel are: the preface addressed to Theophilus; the pre-announcement by the angel Gabriel of the birth of John to Zacharias, and of Jesus to Mary; date of the birth of Jesus connected historically with the reign of Augustus; information concerning his birth given by the angel to the shepherds of Bethlehem; account concerning his childhood and youth; date of John's ministry connected historically with the reign of Tiberius and the Roman governors of Palestine; baptism of Jesus, and genealogical table ascending to Adam; the temptations; return to Galilee and ministry there; address at Nazareth; teaching and mighty works in Capernaum; the calling of Peter, James, and John; the leper cleansed; great multitudes of the sick restored, the paralytic forgiven and cured; call of Levi (Matthew) the publican, followed by the feast at which a great number of publicans and sinners were guests; claim of Jesus to be lord of the Sabbath, sustained by restoring the withered hand; the choice of the 12 apostles; multitudes from all parts of the land healed; discourse corresponding with the "sermon on the mount;" the centurion's servant healed; the widow's son raised; the message from John the baptist in prison, the answer returned, and the testimony concerning him; the woman in the Pharisee's house; parable of the sower, and of the lighted candle; the storm on the lake; the man among the tombs, and the demons among the swine; the woman healed by touching the hem of Jesus's garment; the daughter of Jairus raised; the 12 apostles sent forth; Herod perplexed; the 5,000 fed; Peter's avowal of faith; the transfiguration; the evil spirit cast out; the ambition of the disciples condemned, their narrow views corrected, their intolerance reproved; the 70 sent forth and their joyful return; the lawyer's question answered; the good Samaritan; Martha's care and Mary's choice; instructions concerning prayer; demons cast out; the sign of Jonah given to the Jews; the lighted candle used in parable a second time; denunciations against the Pharisees, lawyers, and scribes; warnings against their hypocrisy, and against covetousness, illustrated by the parable of the rich man; counsel to dismiss anxious thought, to trust God's providential care, and give supreme attention to his service; warning against measuring guilt by suffering; the barren fig-tree; the woman healed on the Sabbath; parable of the mustard seed, and the leaven; the strait gate; lamentation over Jerusalem; the man healed on the Sabbath; seeking the chief places at feasts; the great supper and the excuses made; counting the cost, salt losing its savor, parables of the lost sheep, of the lost money, of the prodigal son, of the unjust steward, of the rich man and Lazarus; against offenses; forgiveness to be proportioned to repentance; the power of genuine faith; the ten lepers cleansed; the sudden coming of the Son of man; the unjust judge, the Pharisee and publican; infants brought to Jesus; the young ruler; the death of the Son of man foretold; the blind man at Jericho; Zacchæus the publican; the parable of the pounds; entrance into Jerusalem and lamentation over its doom; cleansing of the temple; question to the chief priests and others concerning John's baptism; the husbandmen and the vineyard; hypocritical question of the Pharisees concerning tribute, scoffing question of the Sadducees concerning the resurrection, and silencing question of Jesus concerning the Messiah; the gifts of the rich men and of the poor widow; the destruction of the temple foretold, with the captivity of the Jews, the treading down of Jerusalem, and the coming of the Son of man; conspiracy

of the chief priests and scribes against Jesus and their covenant with Judas; the passover kept by Jesus and the twelve, with the pre-announcement of the betrayal, of Peter's denial, and the institution of the Lord's-supper; prayer and conflict at the mount of Olives; betrayal, arrest, denial by Peter, condemnation by the council, examination by Herod and Pilate, the latter proclaiming the innocence of Jesus, yet ordering his death; the crucifixion and scenes connected with it; the body given to Joseph and buried by him in a new rock-hewn sepulcher; appearance of angels to the women at the tomb, announcing the resurrection of Jesus; visit of Peter to the spot; appearance of Jesus to two disciples and afterwards to the company of them; expounding of the Scriptures to them, with the direction that the gospel should be preached among all nations, beginning at Jerusalem; ascension of Jesus to heaven from Bethany in the midst of the disciples, and their subsequent thanksgiving and praise.

LULL, RAMON. See LULLY, RAYMOND, *ante*.

LULLY, RAYMOND, "the enlightened doctor," one of the most distinguished men of the 13th c., was b. at Palma, in Majorca, in 1234. In his youth he led a dissolute life, and served for some time as a common soldier; but a complete revulsion of feeling taking place, he withdrew to solitude, and gave himself up to ecstatic meditations and the study of the difficult sciences. This sudden change of life produced in Lully a fervid and enthusiastic state of mind, under the influence of which he formed the project of a spiritual crusade for the conversion of the Mussulmans, an idea he never afterwards abandoned. In pursuance of this project, he commenced an earnest study of theology, philosophy, and the Arabic language; and, after some years, published his great work, *Ars Generalis sive Magna*, which has so severely tested the sagacity of commentators. This work is the development of the method of teaching known subsequently as the "Lullian method," and afforded a kind of mechanical aid to the mind in the acquisition and retention of knowledge, by a systematic arrangement of subjects and ideas. Like all such methods, however, it gave little more than a superficial knowledge of any subject, though it was of use in leading men to perceive the necessity for an investigation of truth, the means for which were not to be found in the scholastic dialectics. Lully subsequently published another remarkable work, *Libri XII. Principiorum Philosoph. contra Averroistas*, and, full of the principles which he had developed in this book, he went to Tunis, at the end of 1291, or the beginning of 1292, to argue with his opponents, face to face. He drew large crowds of attentive hearers, and held disputations with learned Mohammedans, who, however, were as anxious to convert him as he to convert them, and the result, as might have been expected, was that little impression was made by either of the parties. Finally, however, Lully was thrown into prison, and condemned to banishment. After lecturing at Naples for several years, he proceeded to Rome; thence to his native island of Majorca, where he labored for the conversion of the Saracens and Jews; thence to Cyprus and Armenia, zealously exerting himself to bring back the different schismatic parties of the oriental church to orthodoxy. In 1306–7 he again sailed for Africa, entered the city of Bugia (then the capital of a Mohammedan empire), and undertook to prove the truth of Christianity. A tumult arose, in which Lully nearly lost his life. He was again thrown into prison, and treated with great severity; yet so high an opinion was entertained of his abilities, that the chief men of the place were anxious that he should embrace Mohammedanism, and promised him if he did so the highest honors. But to Lully, whose intellect and feelings were both enlisted in the cause of Christianity, this was impossible. After some time he was again banished from the country, and landed (after being shipwrecked) near Pisa. He subsequently went to Paris, and lectured against the principles of Averroes; he also induced the pope to establish chairs for the Arabic, Chaldee, and Hebrew languages in all cities where the papal court resided, and also at the universities of Paris, Oxford, and Salamanca. But his missionary zeal could only be satiated by martyrdom. In 1314 he sailed once more for Africa, and proceeded to Bugia, where he threatened the people with divine judgments if they refused to abjure Mohammedanism. The inhabitants were furious, dragged him out of the city, and stoned him to death, June 30, 1315. The Mayence (10 vols., 1721–42) edition of his works includes several books on alchemy, of which there is not the slightest reason to suppose Lully was the author. Compare Neander's *Kirchengeschichte*, Bohn's translation, vol. vii. pp. 83–96.

LULLY', or LULLI, JEAN BAPTISTE, 1633–87; b. Florence. He was the son of a miller, but having displayed, while still a child, a remarkable natural gift for music, he was spared from following his father's vocation, and educated by a monk in the use of the guitar. Chancing to fall under the notice of the chevalier Guise, he was recommended by that nobleman to Mlle. de Montpensier, the niece of Louis XIV., who engaged him as a page and sent for him to be brought to Paris. He was at this time 14 years of age, and was witty and otherwise gifted; but it appears that he could boast of no personal beauty, and he was accordingly degraded to the kitchen, and began his official life as a *marmiton*, or scullion. He had by this time gained some acquaintance with the use of the violin, and, by devoting all his leisure to practice on that instrument, he succeeded in acquiring considerable mastery over it, and was presently released from his bondage and placed among the 24 violinists attached to the service of the king. He soon undertook composition, and so successfully that the king, having heard him per-

form his own pieces, made him the leader of a new band, called "les petits violons." Lully now rose rapidly; and being at first employed in composing music for the ballets which formed a principal entertainment at the court of Louis XIV., he was appointed superintendent of court music, and finally placed at the head of the académie royale de musique, which the king founded in 1669. His fortune was now assured; and being the king's favorite, he speedily amassed great wealth, and was honored by being made one of the king's secretaries. His death resulted from improper treatment by an unskillful practitioner, after a slight accident which occurred to him while directing a rehearsal. Lully composed 19 operas, besides ballet music and miscellaneous pieces. He has been generally accorded the reputation of being the father of French dramatic music; and even such composers as Handel and Purcell have not hesitated to acknowledge their obligations to him. He was on terms of intimacy with Molière, composed music for some of his pieces, and even acted with success in his comedies. He married, in 1662, Mlle. Lambert, and had 3 sons and 3 daughters. After his death, an inventory of his possessions valued his silver-plate at 16,707 livres; his jewels, etc., 13,000 livres; his ready money, 250,000 livres; his movables at the opera, 11,000 livres; and the house itself, 80,000 livres. Besides these, the rents of several houses, 4,600 livres a year. And, finally, his widow sold his place of royal secretary for 71,000 livres. Up to 1778, Lully's operas continued to hold the public favor; but after that period, Gluck, Piccini, and Paesiello came into fashion, and he was heard no more. One of his operas was *Acis et Galatée*, and was published with a portrait of the composer. The entire 19 of his operas were published in score.

LUMBAGO is a rheumatic affection of the muscles in the lumbar region, or in the small of the back. It is often first recognized by the occurrence of a sharp stabbing pain in the loins upon attempting to rise from the recumbent or sitting position. It is sometimes so severe as to confine the patient to bed and in one position, from which he cannot move without intense suffering; but in milder cases he can walk, although stiffly and with pain, and usually with the body bent more or less forward. It may be distinguished from inflammation of the kidneys by the absence of the peculiar direction of the pain towards the groin, as also by the absence of the nausea and vomiting which usually accompany the disease of the kidney.

The causes of lumbago are the same as those of sub-acute rheumatism generally. The complaint may arise from partial exposure to cold, especially when the body is heated, and violent straining will sometimes induce it. In persons with a strong constitutional tendency to rheumatism, the slightest exciting cause will bring on an attack of lumbago.

The treatment must vary with the intensity of the affection. In most cases, a warm bath at bed-time, followed by ten grains of Dover's powder, will speedily remove it; and as local remedies, a mixture of chloroform and soap-liniment, or the application of the heated hammer (an instrument sold by Coxeter, surgical-instrument maker, London), will be found serviceable. The writer of this article has frequently seen the disorder completely disappear after one application of the hammer, which should be heated in a spirit-lamp to somewhat about 200°, and then be rapidly brought in contact with points of the skin over the painful parts at intervals of about half an inch. Each application leaves a red spot, but blisters seldom occur, if the operation is properly performed.

LUMBER TRADE, including, in its widest sense (in American usage), the commerce in timber for building houses, ships, etc., boards, planks, laths, scantling, shingles, clapboards, railroad ties, telegraph poles, etc., is one of the most extensive and important industries of the United States, and, indeed, of the world. Norway, Russia, and Germany are largely engaged in this traffic, and France cuts a considerable amount of fine timber. Tropical countries furnish dye-woods, veneering, etc. From the West Indies come mahogany, lance-wood, snake-wood, green-heart, etc.; and India, Australia, and New Zealand furnish large supplies of ship-timber. British North America, including Canada, New Brunswick, and Columbia, furnishes lumber to an immense extent. In the United States the most important lumber districts are in Maine, New York, Pennsylvania, Michigan, Illinois, Wisconsin, Minnesota, Indiana, North and South Carolina, Georgia, Florida, the southern portions of Alabama and Mississippi, Texas, northern California, western Oregon, and the region around Puget sound. Indeed, nearly all the states in the union produce lumber in considerable quantities. The most important centers of the trade are Bangor, Me., Boston, Chicago and the lake ports generally, Albany, N. Y., Savannah, Brunswick, Ga., and Pensacola. According to the census of 1870, the number of establishments producing lumber in some form was 26,945; number of men employed, 163,637; capital invested, $161,500,273; wages paid, $46,231,328; total value of products, $252,339,029. Indeed, so extensive is this traffic that many portions of the country are being denuded of trees with a rapidity which excites alarm for the meteorological effects likely to ensue.

LUMINOSITY OF ORGANIC BEINGS. Many organic beings, both vegetables and animals, possess the property of emitting light.

In cryptogamic plants it has been observed on the filaments of *schistostega osmundacea*, one of the order of hepaticæ; in *rhizomorpha subterranea*, belonging to the order

of fungi (which is not uncommon on the walls of dark, damp mines, caverns, etc., and occasionally emits a light sufficiently clear to admit of reading ordinary print); in certain species of *agaricus* (belonging to the same order); and in *thelaphora cærulea* (also a fungus), to which decayed wood owes its phosphoric light.

An emission of light, chiefly in flashes, has been observed in the case of a few phanerogamic plants, among which may be mentioned the garden nasturtium and marigold, the orange lily, and the poppy. In these instances the light has been emitted by the flowers; but cases are also recorded in which the leaves, juice, etc., of certain plants have evolved light. The emission of light from the common potato, when in a state of decomposition, is sometimes very striking. Dr. Phipson, in his work *On Phosphorescence*, mentions a case in which the light thus emitted from a cellarful of these vegetables was so strong as to lead an officer on guard at Strasburg to believe that the barracks were on fire. The phosphorescence in this case is probably due to the same cause as that of decayed wood.

Before proceeding to notice the principal cases in which living animals have been observed to emit light, we shall briefly refer to the emission of light by dead animal matter. The bodies of many marine animals shine after death, but in none is the phenomenon so vivid or continuous as in the well-known boring mollusk the *pholas*. The luminosity of this animal after death was known to Pliny, who said that it shone in the mouths of persons who ate it; and has been made the subject of special investigation by Réaumur, Beccaria, and others. Among other results, they found that a single *pholas* rendered seven ounces of milk so luminous that the faces of persons might be distinguished by it; and that, by placing the dead animal in honey, its property of emitting light, when plunged into warm water, lasted more than a year.

It is universally known that certain kinds of dead fish, especially mackerels and herrings, shine in the dark. From a careful study of the body of a dead stock-fish in a luminous condition, Dr. Phipson finds that the phenomenon is due to a grease which shines upon the fish, and which (as it neither contains phosphorus nor minute fungi, by which the light might have been caused) contains some peculiar organic matter, which shines in the dark like phosphorus itself.

Several cases are on record in which ordinary butcher's meat has presented the phenomenon now under consideration, but their occurrence is so rare that we need not specially notice them. It may be observed that phosphorescent light is not unfrequently observed on the dead human body by persons who visit dissecting-rooms by night. The occasional evolution of light by living human beings will be presently referred to.

The living animals which possess the property of emitting light are extremely numerous, decided cases of phosphorescence having been frequently observed, according to Dr. Phipson, "in infusoria, rhizopoda, polypes, echinoderms, annelides, medusæ, tunicata, mollusks, crustaceans, myriapodes, and insects." Following the arrangement here laid down, we shall mention a few of the organisms in which the phenomenon in question is most remarkable. Among the rhizopoda the *noctiluca miliaris*, a minute animal very common in the English channel, stands pre-eminent. Dr. Phipson relates that he has found it "in such prodigious numbers in the damp sand at Ostend that, on raising a handful of it, it appeared like so much molten lava." It is the chief cause of the phosphorescence of the sea which is so often observed. Among the annelides, earthworms occasionally evolve a shining light like that of iron heated to a white heat. Among the tunicata, a minute animal common in some of the tropical seas, the *pyrosoma Atlantica* resembles a minute cylinder of glowing phosphorus, and sometimes occurs in such numbers that the ocean appears like an enormous layer of molten lava or shining phosphorus. Among the myriapodes, certain centipedes—viz., *scolopendra electrica* and *S. phosphorea*—present a brilliant phosphoric appearance. There is reason to believe that the former will not shine in the dark unless it has been previously exposed to the solar rays. Luminosity in insects occurs in certain genera of the coleoptera and hemiptera, and possibly in certain lepidoptera and orthoptera. Among the coleoptera must be especially mentioned the genus *lampyris*, to which the various species of glow-worms (q.v.) belong, and the genus *elater*, to which the fireflies (q.v.) belong. In the hemiptera there is the genus *fulgora*, or lantern-flies (q.v.), some species of which are highly luminous.

The evolution of light from animals belonging to the vertebrates is extremely rare. Bartholin, in his treatise *De Luce Hominum et Brutorum* (1647), gives an account of an Italian lady, whom he designates as "mulier splendens," whose body shone with phosphoric radiations when gently rubbed with dry linen; and Dr. Kane, in his last voyage to the polar regions, witnessed almost as remarkable a case of human phosphorescence. A few cases are recorded by sir H. Marsh, prof. Donovan, and other undoubted authorities, in which the human body, shortly before death, has presented a pale, luminous appearance.

It is very difficult to give a satisfactory explanation of the above facts. The light evolved from fungi is most probably connected with chemical action, while that emitted in sparks and flashes from flowers is probably electrical. In some luminous animals, a phosphorescent organ, specially adapted for the production of light, has been already detected, and, as anatomical science progresses, the same will probably be found in all organisms endowed with luminous or phosphorescent properties. For full

details on the subject of this article, the reader is referred to Dr. Phipson's work, *On Phosphorescence* (London, 1862).

LUMPKIN, a co. in n. Georgia, drained by the head-waters of the Chattahooche river, called the Chestatee river, and the river Etowah; 400 sq.m.; pop. '80, 6,519—6,513 of American birth, 452 colored. Its surface, presenting features of great natural beauty, is varied by hills covered with forests of ash, hickory, oak, and maple, which hills, rising in the n.w. section, form a part of the Blue Ridge. Gold, granite, iron, lead, silver, and copper represent its mineral wealth; silurian limestone and sandstone are abundant. Its soil is favorable to stock-raising and the production of buckwheat, barley, oats, and grain in general, wool, sweet potatoes, dairy products, and sorghum. It produced in '70, 9,215 lbs. of honey. It had in '70, 3 gold quartz mills, employing 45 hands, with a capital of $21,500, and an annual product of $10,780. Seat of justice, Dahlonega.

LUMPKIN, Joseph Henry, ll.d., 1799–1867; b. Ga.; brother of Wilson. After graduating at the college of New Jersey, he was admitted to the bar, in which he soon attained high rank, but from which he was compelled by ill-health to retire in 1844. In 1845 he became associate justice of the supreme court of Georgia, and soon after was elected chief-justice, a position which he held by successive re-elections till his death. He was the founder of, and a professor in, the Lumpkin law school attached to the state university at Athens.

LUMPKIN, Wilson, 1783–1870; b. Va.; removed to Georgia, entered the bar, and served for several terms in the state legislature. He was a member of congress, 1815–17 and 1827–31; governor of Georgia, 1831–35; and U. S. senator, 1837–41.

LUMP'SUCKER, or Lumpfish (*cyclopterus*), a genus of fishes of the family *discoboli* (q.v.), having the head and body deep, thick, and short, the back with an elevated ridge, the fins rather small, and the ventrals united by a membrane so as to form a sucking disk.—One species (*C. lumpus*) is common on the coasts of Britain, particularly in the northern parts, and is still more plentiful in the seas of more northern regions. It has a grotesque and clumsy form, but its colors are very fine, combining various shades of blue, purple, and rich orange. It attains a pretty large size, and sometimes weighing seven pounds. The lumpsucker preys on smaller fishes. Its sucker is so powerful that a pail containing some gallons of water has been lifted when a lumpsucker contained in it was taken by the tail. Its flesh is insipid at some seasons, but very fine at others, and is much used for food in northern regions. It is often brought to the Edinburgh market. It is known in Scotland as the *Cock Paidle*.

LUMSDEN, Matthew, 1777–1835; b. Scotland; went to India in 1794, and became a magistrate in Calcutta. He was employed as a Persian translator by the East India company, and in 1805 became professor of Persian and Arabic in the college of Fort William, in Bengal. He was afterwards appointed to the superintendency of the Mohammedan college at Calcutta. Besides a number of translations, he published a *Grammar of the Persian Language*, 1810; *Grammar of the Arabic Language*, 1813; and *Selections for the Persian Class*.

LUNA, or Sele'ne, in mythology, the sister of Helios and goddess of the moon. Some writers term her the daughter and others the wife of Helios, and mother of the four seasons. By Jupiter she had a daughter, Pandia; and Hersa (dew) was the offspring of the king of heaven and the goddess of the moon. She was worshiped by the Romans, though not esteemed as one of the important deities. She had, however, a temple on the Palatine, which was illuminated nightly.

LUNA, Alvaro de, 1390–1453; b. Spain; was educated with the infant king, John II., with whom he made his escape from the custody of the infante of Aragon in 1418. He led a successful revolution in behalf of the rights of the crown, and in 1423 was made constable of Castile. He became the favorite minister of the king, but his enemies succeeded in twice driving him from the court, first in 1426, and next in 1439. In 1445 he was victorious in a war against the infantes of Aragon, for which he was rewarded with the grand-mastership of Santiago, which he held together with the dukedom of Truxillo and the lordship of 60 towns and fortresses. He was at last overcome by an intrigue, condemned to death, and executed at Valladolid.

LUNA, Pedro de, 1334–1424; b. Spain; received a cardinal's hat from Gregory XI.; and on the death of the Avignon pope, Clement VII., in 1394, was elected pope by the Avignon cardinals, on condition that he should resign at the request of the college of cardinals, or whenever the pope at Rome should resign, so that a new pope might be chosen, and the great schism ended. Luna took the name of Benedict XIII., and refused to resign when requested; and the Roman pope, Boniface VIII., likewise refused to resign. At a council in Paris, 1398, it was decided to refuse obedience to Benedict; he was besieged in Avignon, but succeeded in making his escape. In 1403 France, the greater part of Spain, Portugal, Scotland, and Sicily had acknowledged him as the lawful pope; but in 1409 the council of Pisa deposed both Benedict and Gregory XII., who had been in the meantime elected pope at Rome, and conferred the tiara upon Pietro Filargo as Alexander V., who died in 1410, and was succeeded by Baltassare Cossa as John XXIII. Spain and Scotland continued to acknowledge Benedict; John XXIII.

and Gregory XII. abdicated, but Benedict refused to do so even after the council of Constance (which had been sitting since 1414) had elected, in 1417, Ottone Colonna as pope Martin V. Benedict withdrew to the fortress of Peniscola in Valencia, and continued in schism till his death.

LUNACY. By the law of England, as well as of all other countries, the presumption is in favor of a man's sanity, even though he be born deaf, dumb, and blind; and if the fact is disputed, it always lies on the party alleging it to prove it. Sometimes a person in a state supposed to be that of a lunatic makes a contract, and is sued upon it; in such a case, he may set up as a defense that he was a lunatic, and the proof will consist of his conduct and actions at and previous to the time in question. If, however, the other party did not know of the lunacy, and took no advantage, the lunatic will not be allowed to recover back moneys which have been paid by him in pursuance of his contract. Though the presumption is in favor of the sanity of a person, yet, when once insanity has existed, the presumption is reversed, and then the law presumes no lucid interval or restoration to sanity until it is proved; and it is extremely difficult to prove a lucid interval, for the law requires very clear and conclusive proof of that fact, and all the circumstances must be carefully scanned. It is difficult or impossible to define in words what is insanity or lunacy, it being a negative state, and merely an inference from the acts, conduct, and bodily condition of the person. An idiot is said to be a person who was born with a radical infirmity of mind, and whose state is one of perpetual infirmity, incapable of cure or restoration; whereas a lunatic is one who is sometimes of good and sound mind, and sometimes not; he has lucid intervals, and is assumed to be more or less capable of restoration to sanity. A person is said to be, in legal phraseology, of unsound mind, who is not an idiot, nor a lunatic, nor yet of a merely weak mind, but, by reason of a morbid condition of intellect, is as incapable of managing his affairs as if he were a lunatic. Though it is difficult to define lunacy or insanity, there are various tests which are more or less accepted in everyday life as strong evidence. Idiocy is accompanied by a vacant look, etc., while insanity is accompanied by some frenzy or extravagant delusion. The physiology of idiocy and lunacy is a separate subject of investigation, and is part of medical jurisprudence, to which a few medical men confine their attention, and their assistance is often required by courts of law when inquiring into this state of mind, though their theories are jealously scrutinized. As a general rule, an idiot or a lunatic is subject to civil incapacity. He cannot enter into contracts or transact general business, and what he does is a nullity. Thus he cannot make or revoke a will, or enter into marriage, or act as an executor or administrator, or become a bankrupt, or be a witness in a court of justice, or vote at elections, and such like. But, as a general rule, a lunatic is liable in damages for committing a wrong, such as a trespass, and he is liable for necessaries supplied to him, and he may be arrested for debt, and his property may be taken in such cases, as in the case of sane persons. With regard to criminal responsibility, the law was fully considered in the case of McNaughton, who, in 1843, shot Mr. Drummond at Charing Cross by mistake for sir Robert Peel, and the English judges were called on by the house of lords to state their opinion as to the right mode of putting the questions to a jury when the defense of insanity is raised. The judges said that a person laboring under an insane delusion as to one subject is liable to punishment, if at the time of committing the crime he knew he was acting contrary to law. In general cases, to establish want of responsibility, it must be proved that the party accused was laboring under such a defect of reason, from disease of mind, as not to know the nature and quality of the act he was doing, or, if he did know it, that he did not know he was doing what was wrong. Where the party is laboring under an insane delusion as to existing facts, and commits a crime in consequence thereof, it depends on the nature of the delusion whether he is excused. Thus, if he insanely believes that A intended to kill him, and he kills A, as he supposes, in self-defense, he would be exempt from punishment. But if his delusion was that A had inflicted a serious injury to his character and fortune, and he killed A in revenge for such supposed injury, then he would be liable to punishment. When a person is acquitted of crime on the ground of insanity, he is liable to be confined in prison during her majesty's pleasure.

So long as a person is not actually declared insane or an idiot, he has a right to manage his own affairs; and the only way, in England, in which he can be deprived of such right used to be by a writ *de lunatico inquirendo*, issuing out of chancery, which authorized the impaneling of a jury to decide whether he was a lunatic or not. The custody and care of lunatics were vested in the crown; and the lord chancellor, as the depositary of this jurisdiction, issued the writ on petition. The practice has now been considerably altered by various statutes, but, as a general rule, it is still the law, that, unless a person has been officially declared a lunatic, either by the verdict of a jury, or by a certificate of a master in lunacy, he is still entitled to manage his own affairs. In England and Ireland, there is no intermediate state called imbecility or weakness of mind, with which the law interferes, as there is in Scotland (see INTERDICTION, IMBECILITY), and hence, if a weak person is imposed on, it is treated merely as a case of fraud, the weakness forming an element of such fraud; but there is no machinery for restraining the natural right, even of weak-minded persons, to do what they like

with their property. As regards idiots and lunatics, the mode in which they are judicially declared to be so, is as follows: There are certain persons called masters in lunacy, whose business it is to conduct the inquiries which are necessary, and preside over the jury, and they also visit lunatics in certain cases. The commissioners of lunacy form a board, which supervises generally the lunatic asylums and licensed houses for reception of lunatics. The incapacity of a lunatic or idiot is conclusively established by the verdict of a jury under an inquisition *de lunatico inquirendo*, held before a master in lunacy; or, if the case is too clear for a jury, and where the party has not mental capacity to declare his wish on the subject, by a certificate of a master in lunacy. The lord chancellor may direct the trial to take place before one of the common-law judges, and the evidence is to be confined to the lunatic's conduct during the previous two years only. The costs of the trial are in the lord chancellor's discretion. If the party has property, the lord chancellor then appoints, on petition, a committee of the estate or of the person of the lunatic, and the visitors in lunacy must visit such lunatic at least once a year, unless the lunatic is in a private house unlicensed, in which case he must be visited four times each year. The lunatic is thus kept under the immediate control of the court of chancery, which manages his property through the agency of the committee and of the visitors in lunacy. But as many lunatics have no property, or property of a trifling nature, it has long been found necessary to provide asylums and registered houses for the reception of lunatics, all which are more or less under the control of the commissioners in lunacy. Houses kept for the reception of lunatics are either provided by the counties, and called county asylums, or they are hospitals founded by charitable donors, or they are mere private houses, kept for purposes of profit by individuals. County asylums were first established in 1808 (see LUNATIC ASYLUM). The justices of every county are bound to provide such an asylum, or to join with some other parties in keeping one, the expense being defrayed out of the county rates, and a committee of justices being appointed as visitors, to see that the statute is complied with. The object of the county asylum is to receive the lunatic paupers of the county. As a general rule, it is incumbent on the parish officers of each parish to report to the neighboring justices any case of a lunatic pauper being in their parish. In some cases of a harmless description, such paupers may be kept in the workhouse; but in other cases, on the matter being reported to the justices, the latter order the paupers to be brought before them for examination, and then send them to the county asylum; the parish to which the pauper belongs—i.e., in which he is legally settled—being liable to defray the maintenance; but if the parish which is legally bound to support the pauper cannot be discovered, then the expense is to be charged to the county. If the pauper cannot be examined by the justices, the medical officer and a clergyman may sign a certificate, which is taken to be evidence of the lunacy. As to private houses, no person is allowed to receive two or more lunatics, unless such house has been previously licensed by the commissioners in lunacy, which license is only given after inspection, and a report as to its sanitary arrangements and other items of management. No person can be legally received into such licensed house without a written order from the person sending him, and the medical certificates of two physicians, surgeons, or apothecaries. The keepers of such houses are liable to visitation by the commissioners, and to render regular reports as to all particulars concerning the admission, death, removal, discharge, or escape of patients. The commissioners have power to visit at unexpected times, and to receive reports from other visitors. The commissioners may discharge persons who seem to be detained without sufficient cause.

In Scotland, the law differs in several respects from the above. Idiots and lunatics are often called fatuous and furious persons respectively; and there is an intermediate state called imbecility or weakness of mind, upon evidence of which the relations may apply to the court of session for judicial interdiction (q.v.), which has the effect of protecting the imbecile from squandering his heritable property. The care and custody of lunatics and idiots belong to the court of session, which may appoint a *curator bonis* or judicial factor to take charge of the estate, and a curator or tutor dative to take charge of the lunatic's person. A party is cognosced as a fatuous or furious person by a jury presided over by the sheriff. The recent statutory provisions concerning Scotch lunatics are contained in the statutes 20 and 21 Vict. c. 71, 21 and 22 Vict. c. 89, and 25 and 26 Vict. c. 54. There is also a board called the commissioners in lunacy for Scotland, who may grant licenses for private asylums. They may also give special licenses to occupiers of houses for the reception of lunatics, not exceeding four in number, subject to rules and regulations. Counties and parishes may contract for accommodation of their lunatic paupers. Minute provisions are contained in these statutes as to the mode of treatment and visitation of lunatics, which, in leading points, resemble those regulating the practice in England.

LUNACY (*ante*). Courts of justice concern themselves with the subject of insanity only so far as they find it necessary in determining the competency or the responsibility of persons upon whose acts they are required to pass judgment. To the speculations of the psychologist or his labored attempts to find a scientific solution of all the difficulties in which the subject is involved they pay little heed, but carefully limit themselves to the one practical issue with which they have to deal. If an attempt be made to invali-

date a contract or a will on the ground of insanity, the question to be decided is whether the maker was in the possession of his faculties to such a degree as to enable him clearly to understand his obligations and duties, and to protect his own interests; and, even if it be proved that he was in some respects insane, his acts will not, therefore, be regarded as void *ab initio*, but only as voidable if they are shown to be irrational and wrong. If a lunatic buy for himself or his family the necessaries of life, the act being proper and rational in itself and injurious to no one, his estate will be liable for the debt thus incurred; and if he make a will just in itself and injurious to none, it will be respected and enforced. In the case of a criminal in whose behalf the plea of insanity is set up, the question is whether he was in a condition to understand the nature of his act, and had the power of doing or abstaining from doing it. Neither drunkenness nor heat of blood will be accepted as an excuse, for the law assumes that a man is bound to keep his appetites and passions under control. Nor can mental weakness exempt from responsibility for crime, unless it be proved that it was the offspring of disease, and that the disease overpowered the reason and the will. Congenital imbecility, though similar in some of its effects to insanity, is yet not to be confounded therewith, but to be treated upon its own ground. The law knows nothing of any form of insanity that does not spring from bodily disease. No crime, however atrocious, is regarded in law as evidence in itself of insanity, responsibility being assumed until mental unsoundness, the fruit of disease, is proved. No other department of human evidence has led to such interminable debate in courts of law as this. However the common mind may judge as to the application of these principles, and though in their application courts may sometimes have been confused, for the most part our jurisprudence has in this respect proceeded upon the safe ground of common sense. Scientific experts have been allowed great latitude in expounding their theories, but judges have generally been careful, in considering the subject, to keep their feet upon the solid earth, not wandering readily or far from established precedents. The subject is regarded in law under three aspects—insanity, partial insanity, and mental unsoundness. When the reasoning faculties are under constant duress and mental incompetency seems to be a permanent condition of the mind, the law deals with the person as insane, and holds his acts to be voidable, though not necessarily void, as they may sometimes be rational and right. Partial insanity is said to exist when a man is insane in some particulars while perfectly rational in others. In such cases the law has simply to decide how far his acts are rational; and in whatever degree they are so, it will treat them as it would those of a sane person. If a partially insane person make a will or enter into a contract, it will be sustained if no evidence of mental disorder appears upon the face or in the substance of the instrument. Those who deal with a person known to be partially insane do it, however, at their peril. Mental unsoundness is not necessarily the result of any appreciable disease, but may arise from the natural decay of the mental powers in consequence of inherited weakness, or from drunkenness or some other vice. Persons in this condition are not necessarily dangerous to themselves or others, but in some spheres of labor may even be useful. What degree of mental unsoundness in any particular case will justify and require guardianship is a question for the courts to decide. See IMBECILITY, LUNACY.

LUNALILO', WILLIAM CHARLES, sixth king of the Hawaiian islands, 1835–74; b. Honolulu. He was a descendant of Kamehameha I. Kamehameha V., called Lot, being unmarried and dying without naming a successor, prince Lunalilo, a chief of a high family, was chosen king Jan. 1, 1873, and crowned on the 9th. He was educated at the royal school established by the missionaries at Honolulu in 1839. He, with his cousins, Kamehameha IV. and V., received there a good education, showing special taste for literature and poetry. In 1860 he visited California with Lot and David, the first preceding, the last succeeding him as king. Lunalilo, before his accession, was dissipated, but reformed and made a good and popular ruler. After reigning one year and twenty-five days he died without naming a successor, and David Kalakaua was appointed king by the legislature.

LUNAR CAUSTIC is the term applied to the fused nitrate of silver when cast into small cylinders. It is, when freshly prepared, of a whitish striated appearance; but on exposure to the air the outer surface becomes decomposed and blackens.

The uses of lunar caustic in surgery as a caustic are numerous. It is a useful application to punctured and especially to poisoned wounds. When applied to large indolent ulcers it acts as a stimulant, and restores a more healthy action. It is used to remove and keep down spongy granulations (popularly known as proud flesh) in wounds and ulcers, and to destroy warts. It has been applied with good effect to the pustules in small-pox, in order to cut short their progress and to prevent pitting. It is of great service as a local application in inflammatory affections and ulcerations of the mucous membrane of the mouth and throat. In fissured or excoriated nipples its application gives great relief. It should be insinuated into all the cracks, and the nipple afterwards washed with tepid milk and water. It is also extensively employed in diseases of the eye, of the genito-urinary organs, and in some forms of skin disease.

LUNAR CYCLE. See METONIC CYCLE.

LUNAR THEORY, a term employed to denote the *à priori* deduction of the moon's motions from the principles of gravitation. See MOON.

LU'NATIC ASYLUM. The first hospitals for the insane of which history or tradition makes mention were the sacred temples in Egypt. In these, it is said, the disease was mitigated by agreeable impressions received through the senses, and by a system resembling and rivaling the highest development of moral treatment now practiced. Monasteries appear to have been the representative of such retreats in the mediæval Christian times; but restraint and rigid asceticism characterized the management. Out of conventual establishments grew the bethlems, or bedlams, with which our immediate ancestors were familiar (see BEDLAM). But, apart from such receptacles, the vast majority of the insane must have been neglected; in some countries, reverenced as specially God-stricken; in others, tolerated, or tormented, or laughed at, as simpletons or buffoons; in others, imprisoned as social pests, even executed as criminals. In a few spots, enjoying a reputation for sanctity, or where miraculous cures of nervous diseases were supposed to have been effected, such as Gheel and St. Suaire, communities were formed, of which lunatics, sent with a view to restoration, formed a large part, and resided in the houses of the peasants, and partook of their labor and enjoyments. Asylums, properly so called, date from the commencement of the present century; and for many years after their institution, although based upon sound and benevolent views, they resembled jails both in construction and the mode in which they were conducted, rather than hospitals. Until very recently, a model erection of this kind was conceived necessarily to consist of a vast block of building, the center of which was appropriated to the residence of the officers, the kitchen and its dependencies, the chapel, etc., from which there radiated long galleries, in which small rooms, or cells, were arranged upon one or both sides of a corridor or balcony, having at one extremity public rooms, in which the agitated or non-industrial inmates, as the case might be, spent the day, while the more tractable individuals were withdrawn to engage in some pursuit, either in workshops, clustered round the central house, or in the grounds attached, which were surrounded by high walls, or by a ha-ha. The population of such establishments, when they were appropriated to paupers, ranged from 100 to 1400 patients. These were committed to a staff composed of a medical officer, matron, and attendants, to whom were directly intrusted the management, discipline, and occupation of the insane, in accordance with regulations or prescriptions issued by the physician. A gradual but great revolution has taken place in the views of psychologists as to the provisions and requirements for the insane during seclusion. As a result of this change, asylums, especially for the wealthy classes, are assimilated in their arrangements to ordinary dwelling-houses; while it is proposed to place the indigent in cottages in the immediate vicinity of an infirmary, where acute cases, individuals dangerous to themselves or others, or in any way untrustworthy, could be confined and actively treated, as their condition might require. In all such establishments, whether now entitled to be regarded as cottage asylums or not, the semblance and much of the reality of coercion has been abolished; the influence of religion, occupation, education, recreation; the judicious application of moral impressions; and the dominion of rational kindness and discriminating discipline, have been superadded to mere medical treatment, and substituted for brute force, terror, and cruelty.—Esquirol, *Des Maladies Mentales*, t. ii.; Guislain, *Sur l'Alienation Mentale;* Browne on *Asylums*, etc.; Conolly on *Construction of Asylums.*

LUNAWAU'RA, a small state of India, under British protection, in the Rewa Caunta division of Guzerat. It is situated on the confines of Guzerat, and is a continuation of the mountain tract which forms the extreme n.e. of that province. The capital, from which the state derives its name, is 160 m. n.w. from Indore, on the left bank of the Mahi, or Myhee, a river which flows into the gulf of Cambay, and is in n. lat. 23° 8′, e. long. 73° 37′. It is a fortified town, the fortifications and town together being about 3 m. in circumference; and is a place of considerable trade. Area of state, 150 sq.m.; pop. '72, about 75,000.

LUND (*Londinum Gothorum*), a city of Gothland, in the extreme s. of Sweden, and in an extensive and fertile plain 30 m. s.e. of Helsingborg. Its population, in 1874, was 11,680; but it was once much larger, when it was the chief seat of the Danish power in the Scandinavian peninsula, and for a long period the capital of the Danish kingdom. The principal building is the cathedral, the lower part of which is as old as the 11th century. It has manufactures of cloth, tobacco, and leather. Lund is one of the oldest towns in Scandinavia; in 920 it was taken and plundered by a band of *vikings;* it was the see of a bishop from the time of the introduction of Christianity, and from 1104 its archbishop long exercised jurisdiction over all Denmark, Sweden, and Norway. Lund has a university, founded in 1628, which has now 30 professors and 500 students, a library of 100,000 volumes, and some thousands of manuscripts, an excellent zoological museum, and a botanic garden.

LUNDY, BENJAMIN, 1789–1839; b. Hardwich, Suffolk co., N. J., of Quaker parentage; had no advantages of education, save those afforded by the common-schools; was imbued with a keen thirst for knowledge, and read eagerly such books as were within his reach. While serving an apprenticeship to the saddler's trade in Wheeling, Va., his heart was touched with sympathy and indignation at the sight of coffles of slaves passing through that place on their way to a southern market, and he resolved to give his life to the work of abolishing slavery. Having completed his apprenticeship, he mar-

ried, and settled in St. Clairsville, Ohio, where he carried on the business of a saddler for four years, accumulating a considerable sum of money. His pecuniary prospects were highly flattering, but the remembrance of the slave was ever with him. Accordingly, he persuaded five others to join him in organizing a "union humane society," which, in a few months, enrolled nearly 500 members. A short time after this he began to discuss the subject of slavery in the *Philanthropist*, a weekly paper published in Mt. Pleasant, Ohio. In the autumn of 1819, the agitation of the "Missouri question" being then rife in the country, he took his whole stock in trade to St. Louis, resolved to sell it and devote the proceeds to the promotion of the antislavery cause. He lost by this venture nearly all that he had accumulated; but this did not discourage him in his chosen course. He devoted himself for a time to the work of exposing the evils of slavery in the newspapers of Missouri and Illinois, hoping in this way to create a public sentiment averse to the admission of Missouri to the union as a slave state; but he soon returned to Ohio, settling at Mt. Pleasant, where, in Jan., 1821, he began the publication of a monthly journal entitled the *Genius of Universal Emancipation*. This paper was shortly afterwards removed to Jonesborough, Tenn., where there was a considerable body of people who shared his hostility to slavery and gave him a warm welcome. In 1824 it was removed to Baltimore, Md., where it was published weekly. Mr. Lundy, while averse to the scheme for colonizing the negroes in Africa, was yet imbued with the idea that some place of refuge outside of the United States was necessary as a means of promoting emancipation; and, in 1825, he visited Hayti, where he sought to make arrangements with the government for the settlement of such emancipated slaves as might be sent thither. In 1828 he journeyed on foot through parts of the middle and eastern states to lecture on slavery and procure subscribers to his paper. He found a few friends ready to aid him, but the people in general had grown apathetic on the subject since the admission of Missouri to the union as a slave state. In the winter of 1828–29 Mr. Lundy was brutally assaulted and nearly killed by Baltimore's great slave-dealer, Austin Woolfolk, who had taken offense at something which had been said of him and his nefarious business in the *Genius of Universal Emancipation*. In the spring of 1829 he made a second visit to Hayti, taking with him a small number of emancipated slaves, for whom he sought an asylum. In the fall of the same year William Lloyd Garrison, by invitation, joined him in Baltimore as co-editor of the *Genius*. The two men were alike in their hostility to slavery, but Mr. Garrison was a pronounced advocate of immediate emancipation, while Mr. Lundy, like most of the antislavery men of that day, was a gradualist, fearing, if not believing, that a sudden emancipation would be dangerous to the public welfare. Mr. Garrison, too, was for emancipation on the soil, while Mr. Lundy was committed to schemes of colonization abroad. When about half the first year of their partnership had expired, Mr. Garrison was convicted of a criminal libel, fined, and thrust into prison for declaring that the domestic traffic in slaves was, in its nature, as piratical as the foreign, and that a New England sea-captain, who had taken a cargo of human flesh from Baltimore to New Orleans, was guilty of conduct which should cover him with "thick infamy." This occurrence led to a dissolution of the partnership between Mr. Lundy and Mr. Garrison, the former continuing the publication of the *Genius*, but making Washington the place of its nominal issue, while it was printed once a month in whatever place he found it convenient to stop for that purpose in the course of his travels. In the winter of 1830–31 he visited the Wilberforce colony of fugitive slaves in Canada, and soon afterwards went to Texas, for the purpose of securing a similar asylum under the Mexican flag. He went to Texas again in 1833, but was baffled in his purpose on account of the scheme for wresting that country from Mexico, and annexing it to the United States. In 1836 he commenced the publication, in Philadelphia, of an antislavery paper, entitled the *National Enquirer*, absorbing therein the *Genius of Universal Emancipation*. A year later he resigned the editorship of the new paper, and in the winter of 1838–39 removed to Lowell, La Salle co., Ill., intending to resume there the publication of the *Genius*, but on the 22d of the ensuing October he died. He was a man of rare courage and self-sacrifice, a pioneer in the movement for the abolition of American slavery. He traveled more than 5,000 miles on foot, and upwards of 20,000 miles in other ways, visiting 19 states of the union, and addressing hundreds of public meetings, to promote the object to which he had devoted his life.

LUNDY ISLE, an island of Devonshire, England, in the mouth of the Bristol channel. It is about 3 m. in length from n. to s., and 1 m. in breadth, having an area of 1800 acres. Its s. point is about 12 m. from Hartland point, on the coast of Devonshire, and its n. end about 29 m. from St. Gowan's head, in Wales. Its shores are rocky and precipitous, and approach to them is rendered dangerous by numerous detached or insular rocks. There is only one landing-place, which is on the s. side, and near it are dangerous reefs and insulated rocks. The pop. in 1871 was 144. Near the southern end of the island is a light-house, on a height 567 ft. above the sea. At an early date this island is said to have belonged to a family named Morisco, one of whom having conspired against the life of Henry III., fled hither, and became a pirate. Lundy Isle was the scene of a remarkable occurrence in the reign of William and Mary. A party of Frenchmen landed from a ship of war under Dutch colors, on pretense of desiring to bury one of the crew in consecrated ground, the coffin being really filled with arms, with

which the party armed themselves in the church, having requested the islanders to leave them alone to their own funeral rites, and issuing forth, they desolated the island, hamstringing the horses and bullocks, flinging the sheep and goats over the cliffs, and stripping the inhabitants even of their clothes. The cliffs of Lundy isle are the resort of multitudes of gannets, or solan geese. Granite is the rock chiefly prevailing in the island, but slate appears at its s. end.

LUNDY'S LANE, BATTLE OF, July 25, 1814. While the American army, 3,000 strong, were in camp at fort Chippewa, on the Niagara river, opposite Buffalo, under command of gen. Brown, intelligence was received at noon that the British gen. Drummond had crossed the Niagara at Queenstown to attack fort Schlosser, the American depot of supplies. Gen. Brown immediately sent col. Winfield Scott (afterward gen.) with 1200 men to make a demonstration on Queenstown. Near sunset, gen. Scott found himself approaching a strong force of the British, posted behind a belt of woods on an eminence, supported by a battery of nine guns, and commanded by gen. Rial. This position was at the head of Lundy's lane, 1½ m. from Niagara Falls. Scott seeing the strength of force opposed, sent back to gen. Brown for support, and at once ordered maj. Jessup with the 25th regiment to attack the English on the left flank, and himself occupied their attention by a vigorous attack in front. Jessup's flank attack was successful, and resulted in the capture of the English gen. Rial. But on the front col. Scott met a galling resistance. Gen. Brown arrived with reinforcements in the evening, and gen. Drummond had arrived and reinforced the enemy. An attack was ordered on the front to capture the English battery. Under cover of the darkness two regiments were pushed forward. The first was repulsed by timely discharges of grapeshot, but col. Scott at the head of the second succeeded in capturing the battery, turned it against the enemy, and enabled gen. Brown to hold the hill in force against three desperate assaults of the English troops to regain possession. The struggle closed at midnight by the withdrawal of the British troops. Considering the small forces engaged, it was a sanguinary battle. Gen. Drummond, as well as gen. Brown and col. Scott, were wounded, the latter severely. After the battle the command devolved on gen. Ripley, who for lack of force was obliged to leave the trophies of the evening's victory, and to retire to fort Chippewa. The American loss in killed and wounded was 743; the British, 878.

LÜNEBURG, formerly a principality in Lower Saxony, now a district in the province of Hanover. Area, 4,293 sq.m.; pop. '71, 384,210, mostly Protestants. The Elbe forms its northern boundary. Great part of the country is occupied by the Lüneburg Heath. See HANOVER.

LÜNEBURG, a t. of Hanover, in the province of the same name, is situated on the river Ilmenau, 24 m. s.e. of Harburg by railway. It is mentioned as early as the age of Charlemagne, and was formerly an important Hanseatic town. It is surrounded with high walls and towers, and possesses many ancient buildings. The trade is considerable. In the immediate vicinity of Lüneburg is the salt-work of Sülze, discovered in the 10th c., and still very productive. Close by is a hill 200 ft. high, with rich seams of lime and gypsum. Pop. '71, 16,284. It was at Lüneburg that the first engagement took place in the German war of liberation, April 2, 1813. About 16 m. to the s.w. of the town, in the Lüneburg Heath, lies the Göhrde, a beautiful forest, with a royal hunting-lodge.

LUNEL, a t. in the s. of France, department of Herault, 14 m. e.n.e. of Montpellier, has a pop. ('72) of 6,973, and a considerable trade in Muscatel wine and raisins. Near it is a cave, important for the fossil bones found in it.

LUNENBURG, a co. in s.e. Virginia, intersected in the extreme s.w. by the Richmond and Danville railroad; bounded on the n.e. by the Nottoway river, and on the s. by the river Meherrin; 410 sq.m.; pop. '80, 11,535—11,434 of American birth, 6,924 colored. Its surface is uneven, and tolerably well wooded. A large proportion of the soil is fertile, and furnishes good grazing facilities. Its leading productions are: tobacco, wool, sweet potatoes, oats, corn, wheat, sorghum, and the products of the diary. Cattle, sheep, and swine are raised. It produced in '70, 3,900 lbs. of honey. Its water-power is utilized by flour and saw mills. Seat of justice, Lunenburg Court-House.

LUNENBURG, a co. in s.e. Nova Scotia, having the Atlantic ocean for its e. and s.e. boundary, drained by Sherbrooke lake in the n., and other small lakes and rivers, including the La Have, emptying into Mahone bay, and thence into the ocean; 1115 sq.m.; pop. '70, 23,834. Its soil is fertile, and its inhabitants are largely engaged in deep sea fishing and in the West India trade. Foreign vessels, which frequently visit its ports, find good anchorage and safe shelter in its harbors and bay. In the n.e. is Chester basin, a small bay, containing, it is said, 365 beautiful little islands. Its industries are represented by spacious yards for ship-building and repairs, tanneries, and saw, mills, and it exports lumber and wood. In the e. section are alkaline springs. Seat of justice, Lunenburg.

LUNENBURG, a thriving seaport of Nova Scotia, the capital of Lunenburg co.; pop. 1500. It was settled by Germans in 1753, and many of the present inhabitants are of

German descent. Its principal exports are fish and lumber. It has considerable trade with the West Indies. It has a deep, capacious, and well-sheltered harbor. Gold is found in the neighborhood.

LUNETTE', in fortification, is a small work beyond the ditch of the ravelin, to supply its deficiency of saliency, and formed at the re-entering angle made by the ravelin and bastion. The lunette has one face perpendicular to the ravelin, and the other nearly perpendicular to the bastion. See FORTIFICATION.

LUNÉVILLE, a t. in the department of Meurthe-et-Moselle, in France, at the confluence of the Meurthe and the Vezouse, is a regularly built and unwalled town. Pop. '72, 11,929. It was formerly a frequent residence of the dukes of Lorraine, and their palace is now used as a cavalry barrack. Lunéville has manufactures of cotton and worsted goods, embroidery, and earthenware. It is one of the largest cavalry stations in France. The town has a historic celebrity from the peace of Lunéville, concluded here on Feb. 9, 1801, between Germany and France, on the basis of the peace of Campo-Formio (q.v.).

LUNGS. See RESPIRATION, ORGANS OF.

LUNGWORT, or OAK-LUNGS, *Sticta pulmonaria*, a lichen with a foliaceous leathery spreading thallus, of an olive-green color, pale brown when dry, pitted with numerous little cavities and netted, much lacerated; the shields (*apothecia*) marginal, reddish brown with a thick border. It grows on trunks of trees in mountainous regions, in Britain and other European countries, sometimes almost entirely covering them with its shaggy thallus. It has been used as a remedy for pulmonary diseases. It is nutritious, and, when properly prepared, affords a light diet, capable of being used as a substitute for Iceland moss; yet it is bitter enough to be used as a substitute for hops. It yields a good brown dye.—The name *lungwort* is also given to a genus of phanerogamous plants (*pulmonaria*), of the natural order *boragineæ*. The common lungwort (*P. officinalis*) is a rare and rather doubtful native of Britain, although common in some parts of Europe. It has ovate leaves and purple flowers, and was formerly employed in diseases of the lungs, but seems to have been recommended chiefly by a fancied resemblance to the lungs in its spotted leaves. It is mucilaginous, and slightly emollient. It contains niter in considerable abundance. It is used in the north of Europe as a pot-herb.

LUNT, GEORGE, 1803; b. Mass.; educated at Harvard university, graduating in the class of 1824, studied law, was admitted to the Essex co. bar, and commenced practice in Newburyport, Mass., in 1831, where he had been at one time principal of the high school. He served several terms in the legislature of his state, being elected to a seat in both branches. In 1839 he published a small volume of poems, which was followed by others in '43, '51, and '54, comprising *The Age of Gold, and other Poems*, and *Lyrics, Poems, Sonnets, and Miscellanies*. In 1845 he read a poem entitled *Culture* before the Boston mercantile library association. In 1848 he removed to Boston, and in the following year was appointed U. S. district attorney by president Taylor, holding the position until 1853, when, under a change of administration, he resumed the private practice of the law. In 1857 he became editor-in-chief of the Boston *Daily Courier*, exerting a marked influence on the democratic politics of the period, and in the same year he wrote *Three Eras of New England*. In 1858 he published *Radicalism in Religion, Philosophy, and Social Life;* in 1860, *The Union*, a poem; and in 1866, *Origin of the Late War*. Other works are: *Eastford; or, Household Sketches by Wesley Brooke*, a novel; and *Julia*, a poem. His writings are distinguished for a finished, brilliant style, the vehicle of vigorous thought.

LUPERCA'LIA, a festival among the ancient Romans, held on Feb. 15, in honor of Lupercus, the god of fertility. When Rome began to seek a Grecian origin for its religious ceremonies, Lupercus was identified with Lycæan Pan, and his worship was said to have been introduced by Evander, the Arcadian. Modern scholars place no value on such statements. Lupercus is believed by them to have been one of the oldest pastoral deities of Italy, and everything that is known regarding him and his rites favors this view. These rites were of the rudest and most primitive character, and indicate a high antiquity. Goats and dogs were sacrificed; afterwards the priests (called Luperci) cut up the skins of the victims and twisted them into thongs, with which they ran through the city striking every one who came in their way (which women used to do) in hopes that the god of fertility would be propitious towards them. As the festival is believed to have been at first a shepherd one, this running about with thongs is understood to have been intended as a symbolical purification of the land. The place where the festival was held was called the Lupercal, and was situated on the Palatine hill. It contained an image of Lupercus, covered with a goat's skin. Lupercalia were also held in other cities of Italy.

LU'PINE, *Lupinus*, a genus of plants of the natural order *leguminosæ*, sub-order *papilionaceæ*, mostly annuals, but some of them perennial herbaceous plants, some half shrubby, and generally having digitate leaves, with rather long stalks. The flowers are in racemes or spikes, the calyx two-lipped, the keel beaked, the filaments all united at the base. The species of lupine are numerous, and are chiefly natives of the countries near the Mediterranean sea, and of the temperate parts of North and South America.

The WHITE LUPINE (*L. albus*), a species with white flowers, has been cultivated from time immemorial in the south of Europe and in some parts of Asia for the sake of the seeds, which are farinaceous, and are used as food, although when raw they have a strong, disagreeable, bitter taste, which is removed by steeping in water and boiling. They were a favorite kind of pulse amongst the ancient Greeks and Romans, and still are so in some parts of the south of Europe, although generally disliked by those who have not been accustomed to them. They are used in many countries for feeding cattle, particularly draught-oxen.—The YELLOW LUPINE (*L. luteus*), so called from its yellow flowers, and the EGYPTIAN WHITE LUPINE (*L. termis*), which has white flowers tipped with blue, are also cultivated in the south of Europe, Egypt, etc., for their seeds, which are similar in their qualities to those of the white lupine.—In many countries, lupines, and particularly the white lupine, are cultivated to yield green food for cattle, and also to be plowed down for manure. They grow well on poor and dry sandy soils, which by this process of green-manuring are fitted for other crops. Many species of lupine are cultivated in our flower-gardens, having beautiful white, yellow, pink, or blue flowers. The flowers of some species are fragrant. No lupine is a native of Britain. *L. perennis* adorns sandy places from Canada to Florida with its fine blue flowers.

LU'PULINE. See HOPS.

LUPUS is a chronic disease of the skin, in which dull or livid tubercles are developed, which have a tendency to destroy or seriously to affect the adjacent tissues, with or without ulceration, and commonly ending in indelible cicatrices. It was formerly known as *noli me tangere*. The disease usually attacks the face, especially the alæ of the nose and the lips, but is sometimes met with elsewhere. It is a terrible disease, but is happily of rare occurrence. It derives its name from the Latin word for *a wolf*, in consequence of its destructive nature.

Lupus usually commences with the appearance of one or two circular or oval, dull-red, somewhat translucent tubercles, about two lines in diameter. After a time, these tubercles increase in number and size, and take on new characters. They may ulcerate, constituting the variety known as *lupus exedens*, in which case the ulceration may pursue a superficial or a deep course. Scabs are formed over the ulcers; and, as these scabs are thrown off, the ulcer beneath is found to have increased in extent, till great destruction of the soft parts and (in the case of the nose) of the cartilages is effected. The ulcer of lupus has thick red edges, and exudes a fetid, ichorous matter, in considerable quantity. When they do not ulcerate, the tubercles are softer than in the previous variety, and form patches of considerable extent, the intervening skin and cellular tissue also swelling and exhibiting here and there dull-red points, which are the summits of the imbedded tubercles. The lips become much enlarged, the nostrils closed with the swelling, the eyelids everted, and the whole face hideous. This variety is known as *lupus non exedens*.

The progress of lupus is usually slow, and the sufferings of the patient less than might be expected, in consequence of the sensibility of the parts being diminished from the first. The complaint may continue for years, or even for life, but is seldom fatal. Its causes are not well known, but it is thought that a scrofulous habit and intemperance predispose to the disease. Both sexes are liable to it, but it seems most common in women. It is not contagious.

The internal treatment consists in the administration of cod-liver oil and the preparations of iodine, especially Donovan's solution, while locally strong escharotics should be applied. The disease, is, however, so serious, that whenever there is a suspicion of its nature, professional aid should be sought.

LURCH'ER, a kind of dog, somewhat resembling a greyhound, and supposed to derive its origin from some of the old rough-haired races of greyhound crossed with the shepherd's dog. It is lower, stouter, and less elegant than the greyhound, almost rivals it in fleetness, and much excels it in scent. It is covered with rough wiry hair, is usually of a sandy red color, although sometimes black or gray, and has half-erect ears and a pendant tail. It is the poacher's favorite dog, possessing all the qualities requisite for his purposes, in sagacity rivaling the most admired dogs, and learning to act on the least hint or sign from its master. Of course, it is detested by gamekeepers, and destroyed on every opportunity.

LURGAN, a thriving t. of Ireland, in the county of Armagh, a station on the railway from Belfast to Armagh, 20 m. s.w. from the former town. It is unusually neat and clean in appearance, and carries on manufactures of damasks and diapers. Pop. '71, 10,632.

LURISTAN, a province of Persia, on the border of Khuzistan, between the Kerkhah and the Dizful, an affluent of the Karun; is almost entirely occupied by mountains and narrow valleys; 20,000 sq. miles. Near the outer ridges of the mountain region are some plains of moderate extent, which are under cultivation; the remainder of the region serves as pasture-ground for the different tribes of Lurs who inhabit it. The Bakhtiyari, one of these tribes, are ferocious and warlike. The only town is Khorrám-abad, situated in a fertile district, 90 m. s. of Hamadan, on a feeder of the Kerkhah; it contains about a thousand huts, built on the s.w. face of a steep rock, on whose summit are a fortress and a palace.

LURLEI, or LORELEI, the name of a steep rock on the right bank of the Rhine, about 430 ft. high, a little way above St. Goar, celebrated for its echo, which is said to repeat sounds fifteen times. Near it is a whirlpool, and still nearer, a rapid, called the *bank*, formed by the river rushing over a number of sunken rocks—visible, however, at low water. In consequence, the navigation of the Rhine by rafts and boats is rather dangerous at this point, which circumstance, in connection with the *echo*, has undoubtedly given rise to the legend of the beautiful but cruel siren who dwelt in a cave of the Lurlei, and allured the passing voyagers to approach by the magic melody of her song, until she wrecked and sank them in the whirlpool. The legend has been a great favorite with the German poets, but none has treated it so exquisitely as Heine.

LUSA'TIA (*Lausitz*), a region in Germany, now belonging in part to Saxony and in part to Prussia. It was formerly divided into upper and lower Lusatia, which constituted two independent margraviates, including an area of about 4,400 sq.m., and a population of about half a million, and bounded on the s. by Bohemia, on the w. by Misnia and the electorate of Saxony, on the n. by Brandenburg, and on the e. by Silesia. In 1319, Lusatia was given to Bohemia, but was obtained by Matthias Corvinus in 1478, and was finally transferred to Saxony in 1635; but, by the congress of Vienna, the whole of lower Lusatia and the half of upper Lusatia was ceded to Prussia. The portion left to Saxony now forms the circle of Bautzen.

LUSHINGTON, STEPHEN, D.C.L., 1782–1873; b. England; educated at Oxford, and called to the bar in 1806. The next year he was returned to parliament for Great Yarmouth, and represented that and other boroughs till 1841, when he was obliged to retire in consequence of an act of parliament disqualifying the judge of the admiralty from sitting in the commons. He was a follower of Fox and Grenville; and among the parliamentary measures which he supported, were the abolition of the slave-trade, the recognition of the South American republics, and the emancipation of the Jews. In 1820 he was of counsel for queen Caroline, in conjunction with lord Denham and lord Brougham. He was appointed a judge of the consistory court in 1828, and judge of the admiralty in 1838, and, in the latter year, he was sworn in of the privy council. He was the counsel and friend of lady Byron, and an authority on ecclesiastical law.

LUSITA'NIA, a district of ancient Hispania, which, as the country occupied by the Lusitani was, according to Strabo, bounded s. by the Tagus, n. and w. by the ocean. Its extent afterwards was contracted by the growing importance of the Callaici, and the river Durius (*Douro*) became its n. boundary. Afterwards, many of the Lusitanians being driven southward in their long struggles with the Romans, the name Lusitania was given to the district s. of the Tagus. When Augustus divided the peninsula into the three provinces, Bætica, Tarraconensis, and Lusitania, the last occupied the s.w., between the Anas (*Guadiana*) on the e., the sea on the s. and w., and Durius on the north. It comprised the greater part of the modern kingdom of Portugal, besides a large portion of Leon and the Spanish Estremadura. The chief river in the district is the Tagus, flowing w. into the Atlantic. Some of the principal towns are Metellinum (*Medellin*); Emerita Augusta (*Merida*), the Roman capital, on the Anas; Olisipo (*Lisbon*), the capital before the time of the Romans, on the Tagus; Conimbriga (*Coimbra*), on the Munda; Salmantica (*Salamanca*); Pax Julia (*Beja*); Ebora (*Evora*). The province was formerly rich and fertile, and had valuable mines of gold and silver. The Lusitani were a wild and warlike people, much addicted to plunder, especially those living in the mountains. They were the bravest of all the Iberians, and held out the longest in resistance to the Romans. In 153 B.C. they revolted, and for fourteen years fought against the Romans, who, for a time, acknowledged their independence. Viriathus, their chief, a bold and skillful leader, defeated several Roman generals. At length the consul Cæpio, unable to subdue him in the field, captured him by the treachery of some of his intimate friends, and put him to death, when the Lusitanians were completely subdued, 140 B.C.

LUSTER, a term used in mineralogy to denote degrees and qualities of brightness. There are six kinds usually recognized, viz.: metallic, vitreous, adamantine, resinous, pearly, and silky. There are usually four and sometimes five degrees recognized, viz.: splendent, when a perfect image is reflected; shining, glistening; some use the term glimmering when the reflection seems to be limited to points on the surface. Minerals also are said to have a dull luster.

LUSTRATION, in antiquity, purification by sacrifices and various ceremonies. The Greeks and Romans purified the people, cities, fields, armies, etc., defiled by crime or impurity. This was done in several ways, viz.: by fire, water, sulphur, and air, the last by fanning or agitating the air around the thing purified. When Servius Tullius had numbered the Roman people, he purified them as they were assembled in the Campus Martius; and afterwards a lustration of the whole people was performed every fifth year before the censors went out of office. On that occasion the people assembled in the Campus Martius, when the sacrifices termed *suovetaurilia*, consisting of a sow, sheep, and ox, after being carried thrice around the people, were offered up, and a great quantity of perfumes was burned. This ceremony was called *lustrum*. It was instituted by Servius Tullius, 566 B.C., and performed for the last time in the reign of Vespasian. The

term *lustrum* was given also to the period of five years between the lustra. The army was purified before a battle by causing the soldiers to defile before the two quivering halves of a victim, while the priest offered certain prayers. The establishment of a new colony was preceded by a lustration with sacrifices. Rome itself, and all towns within its dominion, always underwent a lustration after being visited by some great calamity. The lustrations of fields were performed after sowing was finished, and before reaping began. The lustration of flocks, designed to keep them from disease, was performed every year at the festival of the Palilia, when the shepherd sprinkled them with pure water, thrice surrounding the fold with savin, laurel, and brimstone set on fire, and afterwards offering incense and sacrifices to Pales, the tutelary goddess of shepherds. Private houses were purified with water, a fumigation of laurel, juniper, olive-tree, and the like, and a pig offered as the victim. Infants were purified, girls on the third, boys on the ninth, day after birth, then named and placed under the protection of the god of the family. The lustration of a funeral pile was by having the spectators march round it before a fire was kindled. Whatever was used at a lustration was cast into a river, or some other inaccessible place, as to tread upon it was considered ominous of some great disaster.

LUSTRUM (from *luere*, to purify or expiate), the solemn offering made for expiation and purification by one of the censors in name of the Roman people at the conclusion of the census (q.v.). The animals offered in sacrifice were a boar (*sus*), sheep (*ovis*), and bull (*taurus*), whence the offering was called *suovetaurilia*. They were led round the assembled people on the Campus Martius before being sacrificed. As the census was quinquennial, the word *lustrum* came to mean a period of five years.

LUTE (Ger. *Laut*, sound), an obsolete stringed musical instrument, which has been superseded by the harp and guitar. It consisted of a table of fir; a body or belly, composed of 9 (sometimes 10) convex ribs of fir or cedar; a neck, or finger-board, of hard wood, on which were 9 (or 10) frets, stops, or divisions, marked with catgut strings; a head, or cross, on which were placed the pegs or screws that tightened or relaxed the strings in tuning; and a bridge, to which the strings were attached at one end, the other end being fastened to a piece of ivory, between the head and neck. The number of strings, originally 6, of which five were doubled, so as to make 11, was gradually increased till they numbered 24. The performer used his left hand to press the stops, and struck the strings with his right. A peculiar description of notation, called *tablature*, was employed in music written for the lute. The strings were represented by parallel lines, on which were placed letters of the alphabet, referring to the frets: thus, A marked that the string was to be struck open (or without pressing any of the stops); B, that the first stop was to be pressed; C, the second, and so on: while over the letters were placed hooked marks, corresponding to the minim, crotchet, quaver, etc., to indicate time. So carelessly and inaccurately was lute-music generally written that it is no easy matter to render it into the ordinary notation. The lute was formerly in high favor all over Europe as a chamber-instrument; and it was used in dramatic music to accompany the recitative. In the time of Handel, there was a lute in the Italian opera in London; and there was a lutanist in the King's chapel down to the middle of last century. —For a minute account of the lute, and how to play it, see Mace's *Musick's Monument* (Lond. 1676).

LUTE (Lat. *lutum*, clay), in chemistry, denotes a substance employed for effectually closing the joints of apparatus, so as to prevent the escape of vapor or gases, or for coating glass vessels so as to render them more capable of sustaining a high temperature, or for repairing fractures. For ordinary purposes, lutes made of common plastic clay or pipe-clay with an admixture of linseed-meal or almond-powder, or, for common stills, linseed-meal and water made into a paste, are quite sufficient; for more delicate experiments, *fat lute* (q.v.), covered over with moistened bladder, is used. Lutes for coating glass vessels are generally composed of Stourbridge clay or Windsor loam, mixed with water; but the most simple method is to brush the glass retort over with a paste of pipe-clay and water, dry it quickly, and repeat the operation till a sufficient thickness of coating is obtained. Other lutes in frequent use are *Willis's lute* (a paste composed of a solution of borax in boiling water, with slaked lime), various mixtures of borax and clay, of lime and white of egg, *iron cement* (see CEMENTS), moistened bladder, paper prepared with wax and turpentine, and caoutchouc. The use of the last-named lute has, on account of its flexibility and consequent non-liability to accident, been rapidly extending.

LUTHER, MARTIN, the greatest of the Protestant reformers of the 16th c., was b. at Eisleben on Nov. 10, 1483. His father was a miner in humble circumstances; his mother, as Melanchthon records, was a woman of exemplary virtue (*exemplar virtutum*), and peculiarly esteemed in her walk of life. Shortly after Martin's birth, his parents removed to Mansfeld, where their circumstances ere long improved by industry and perseverance. Their son was sent to school; and both at home and in school, his training was of a severe and hardening character. His father sometimes whipped him, he says, "for a mere trifle till the blood came," and he was subjected to the scholastic rod fifteen times in one day! Scholastic and parental severity was the rule in these days; but

whatever may have been the character of Luther's schoolmaster at Mansfeld, there is no reason to believe that his father was a man of exceptionally stern character. While he whipped his son soundly, he also tenderly cared for him, and was in the habit of carrying him to and from school in his arms with gentle solicitude. Luther's schooling was completed at Magdeburg and Eisenach, and at the latter place he attracted the notice of a good lady of the name of Cotta, who provided him with a comfortable home during his stay there.

When he had reached his eighteenth year, he entered the university of Erfurt, with the view of qualifying himself for the legal profession. He went through the usual studies in the classics and the schoolmen, and took his degree of doctor of philosophy, or master of arts, in 1505, when he was 21 years of age. Previous to this, however, a profound change of feeling had begun in him. Chancing one day to examine the Vulgate in the university library, he saw with astonishment that there were more gospels and epistles than in the lectionaries. He was arrested by the contents of his newly found treasure. His heart was deeply touched, and he resolved to devote himself to a spiritual life. He separated himself from his friends and fellow-students, and withdrew into the Augustine convent at Erfurt.

Here he spent the next three years of his life—years of peculiar interest and significance; for it was during this time that he laid, in the study of the Bible and of Augustine, the foundation of those doctrinal convictions which were afterwards to rouse and strengthen him in his struggle against the papacy. He describes very vividly the spiritual crisis through which he passed, the burden of sin which so long lay upon him, "too heavy to be borne;" and the relief that he at length found in the clear apprehension of the doctrine of the "forgiveness of sins" through the grace of Christ.

In the year 1507 Luther was ordained a priest, and in the following year he removed to Wittenberg, destined to derive its chief celebrity from his name. He became a teacher in the new university, founded there by the elector Frederick of Saxony. At first, he lectured on dialectics and physics, but his heart was already given to theology, and in 1509 he became a bachelor of theology, and commenced lecturing on the holy Scriptures. His lectures made a great impression, and the novelty of his views already began to excite attention. "This monk," said the rector of the university, "will puzzle our doctors, and bring in a new doctrine." Besides lecturing, he began to preach, and his sermons reached a wider audience, and produced a still more powerful influence. His words, as Melanchthon said, were "born not on his lips, but in his soul," and they moved profoundly the souls of all who heard them.

In 1510 or 1511 he was sent on a mission to Rome, and he has described very vividly what he saw and heard there. His devout and unquestioning reverence, for he was yet, in his own subsequent view, "a most insane papist," appears in strange conflict with his awakened thoughtfulness and the moral indignation at the abuses of the papacy beginning to stir in him.

On Luther's return from Rome he was made a doctor of the holy Scriptures, and his career as a reformer may be said to have commenced. The system of indulgences had reached a scandalous height. The idea that it was in the power of the church to forgive sin had gradually grown into the notion, which was widely spread, that the pope could issue pardons of his own free will, which, being dispensed to the faithful, exonerated them from the consequences of their transgressions. The sale of these pardons had become an organized part of the papal system. Money was largely needed at Rome, to feed the extravagances of the papal court; and its numerous emissaries sought everywhere to raise funds by the sale of "indulgences," as they were called, for the sins of frail humanity: the principal of these was John Tetzel, a Dominican friar, who had established himself at Jüterboch, on the borders of Saxony. Luther's indignation at the shameless traffic which this man carried on, finally became irrepressible: "God willing," he exclaimed, "I will beat a hole in his drum." He drew out 95 theses on the doctrine of indulgences, which he nailed up on the gate of the church at Wittenberg, and which he offered to maintain in the university against all impugners. The general purport of these theses was to deny to the pope all right to forgive sins. "If the sinner was truly contrite, he received complete forgiveness. The pope's absolution had no value in and for itself."

This sudden and bold step of Luther was all that was necessary to awaken a widespread excitement. The news of it spread rapidly far and wide. It seemed "as if angels had carried it to the ears of all men." Tetzel was forced to retreat from the borders of Saxony to Frankfort-on-the-Oder, where he drew out and published a set of counter-theses, and publicly committed those of Luther to the flames. The students at Wittenberg retaliated by burning Tetzel's theses. The elector refused to interfere, and the excitement increased as new combatants—Hochstratten, Prierias, and Eck—entered the field. Eck was an able man, and an old friend of Luther's, and the argument between him and the reformer was especially vehement.

At first the pope, Leo X., took little heed of the disturbance; he is reported even to have said when he heard of it that "Friar Martin was a man of genius, and that he did not wish to have him molested." Some of the cardinals, however, saw the real character of the movement, which gradually assumed a seriousness evident even to the pope; and Luther received a summons to appear at Rome and answer for his theses. Once

again in Rome, it is unlikely he would ever have been allowed to return. His university and the elector interfered, and a legate was sent to Germany to hear and determine the case. Cardinal Cajetan was the legate, and he was but little fitted to deal with Luther. He would enter into no argument with him, but merely called upon him to retract. Luther refused, and fled from Augsburg, whither he had gone to meet the papal representative. The task of negotiation was then undertaken by Miltitz, a German and envoy of the pope to the Saxon court, and by his greater address a temporary peace was obtained. This did not last long. The reformer was too deeply moved to keep silent. "God hurries and drives me," he said; "I am not master of myself; I wish to be quiet, and am hurried into the midst of tumults." Dr. Eck and he held a memorable disputation at Leipsic, in which the subject of argument was no longer merely the question of indulgences, but the general power of the pope. The disputation, of course, came to no practical result; each controversialist claimed the victory, and Luther in the meantime made progress in freedom of opinion, and attacked the papal system as a whole more boldly. Erasmus and Hutten joined in the conflict, which waxed more loud and threatening.

In 1520 the reformer published his famous address to the "Christian nobles of Germany." This was followed in the same year by a treatise *On the Babylonish Captivity of the Church*. In these works, both of which circulated widely, and powerfully influenced many minds, Luther took firmer and broader ground: he attacked not only the abuses of the papacy and its pretensions to supremacy, but also the doctrinal system of the church of Rome. "These works," Ranke says, "contain the kernel of the whole reformation." The papal bull was issued against him; the dread document was burned before an assembled multitude of doctors, students, and citizens at the Elster Gate of Wittenberg. Germany was convulsed with excitement. Eck (who had been the chief agent in obtaining the bull) fled from place to place, glad to escape with his life, and Luther was everywhere the hero of the hour.

Charles V. had at this time succeeded to the empire, and he convened his first diet of the sovereigns and states at Worms. The diet met in the beginning of 1521; an order was issued for the destruction of Luther's books, and he himself was summoned to appear before the diet. This was, above all, what he desired—to confess the truth before the assembled powers of Germany. He resolved to obey the summons, come what would. All Germany was moved by his heroism; his journey resembled a triumph; the threats of enemies and the anxieties of friends alike failed to move him. "I am resolved to enter Worms," he said, "although as many devils should set at me as there are tiles on the house-tops." His appearance and demeanor before the diet, and the firmness with which he held his ground, and refused to retract, all make a striking picture. "Unless I be convinced," he said, "by Scripture and reason, I neither can nor dare retract anything, for my conscience is a captive to God's word, and it is neither safe nor right to go against conscience. There I take my stand. I can do no otherwise. So help me, God. Amen."

On his return from Worms he was seized, at the instigation of his friend, the elector of Saxony, and safely lodged in the old castle of the Wartburg. The affair was made to assume an aspect of violence, but in reality it was designed to secure him from the destruction which his conduct at Worms would certainly have provoked. He remained in this shelter for about a year, concealed in the guise of a knight. His chief employment was his translation of the Scriptures into his native language. He composed various treatises besides, and injured his health by sedentary habits and hard study. His imagination became morbidly excited, and he thought he saw and heard the evil one mocking him while engaged in his literary tasks. On one occasion he hurled his inkstand at the intruder, and made him retreat. The subject of the personality and presence of Satan was a familiar one with Luther, and he has many things about it in his *Table-talk*.

The disorders which sprang up in the progress of the reformation recalled Luther to Wittenberg. He felt that his presence was necessary to restrain Carlstadt and others, and, defying any dangers to which he might still be exposed, he returned to the old scene of his labors, rebuked the unruly spirits who had acquired power in his absence, and resumed with renewed energy his interrupted work. He strove to arrest the excesses of the Zwickau fanatics, and counseled peace and order to the inflamed peasants, while he warned the princes and nobles of the unchristian cruelty of many of their doings, which had driven the people to exasperation and frenzy. At no period of his life is he greater than now in the stand which he made against lawlessness on the one hand and tyranny on the other. He vindicated his claim to be a reformer in the highest sense by the wise and manly part which he acted in this great social crisis in the history of Germany.

His next act of importance was by no means so commendable. Although he had been at first united in a common cause with Erasmus, estrangement had gradually sprung up between the scholar of Rotterdam and the enthusiastic reformer of Wittenberg. This estrangement came to an open breach in the year 1525, when Erasmus published his treatise *De Libero Arbitrio*. Luther immediately followed with his counter-treatise, *De Servo Arbitrio*. The controversy raged loudly between them; and in the vehemence of his hostility to the doctrine of Erasmus, Luther was led into various asser-

tions of a very questionable kind, besides indulging in wild abuse of his opponent's character. The quarrel was an unhappy one on both sides; and it must be confessed there is especially a want of generosity in the manner in which Luther continued to cherish the dislike which sprung out of it.

In the course of the same year, Luther married Katharina von Bora, one of nine nuns, who, under the influence of his teaching, had emancipated themselves from their religious vows. The step rejoiced his enemies, and even alarmed some of his friends like Melanchthon. But it greatly contributed to his happiness, while it served to enrich and strengthen his character. All the most interesting and touching glimpses we get of him henceforth are in connection with his wife and children.

Two years after his marriage he fell into a dangerous sickness and depression of spirits, from which he was only aroused by the dangers besetting Christendom from the advance of the Turks. Two years later, in 1529, he engaged in his famous conference at Marburg with Zwingli and other Swiss divines. In this conference he obstinately maintained his peculiar views as to the sacrament of the Lord's-supper (q.v.; see also IMPANATION); and, as in the controversy with Erasmus, distinguished himself more by the inflexible dogmatism of his opinions than by the candor and comprehensiveness of his arguments, or the fairness and generosity of his temper. Aggressive and reforming in the first stage of his life, and while he was dealing with practical abuses, he was yet in many respects essentially conservative in his intellectual character, and he shut his mind pertinaciously after middle life to any advance in doctrinal opinion. The following year finds him at Coburg, while the diet sat at Augsburg. It was deemed prudent to intrust the interests of the Protestant cause to Melanchthon, who attended the diet, but Luther removed to Coburg, to be conveniently at hand for consultation. The establishment of the Protestant creed at Augsburg marks the culmination of the German reformation; and the life of Luther from henceforth possesses comparatively little interest. He survived 16 years longer, but they are years marked by few incidents of importance. He died in the end of Feb., 1546.

Luther's character presents an imposing combination of great qualities. Endowed with broad human sympathies, massive energy, manly and affectionate simplicity, and rich, if sometimes coarse humor, he is at the same time a spiritual genius. His intuitions of divine truth were bold, vivid, and penetrating, if not comprehensive; and he possessed the art which God alone gives to the finer and abler spirits that he calls to do special work in this world, of kindling other souls with the fire of his own convictions, and awakening them to a higher consciousness of religion and duty. He was a leader of men, therefore, and a reformer in the highest sense. His powers were fitted to his appointed task: it was a task of Titanic magnitude, and he was a Titan in intellectual robustness and moral strength and courage. It was only the divine energy which swayed him, and of which he recognized himself the organ, that could have accomplished what he did.

Reckoned as a mere theologian, there are others who take higher rank. There is a lack of patient thoughtfulness and philosophical temper in his doctrinal discussions; but the absence of these very qualities gave wings to his bold, if sometimes crude, conceptions, and enabled him to triumph in the struggle for life or death in which he was engaged. To initiate the religious movement which was destined to renew the face of Europe, and give a nobler and more enduring life to the Saxon nations, required a gigantic will, which, instead of being crushed by opposition or frightened by hatred, should only gather strength from the fierceness of the conflict before it. To clear the air thoroughly, as he himself said, thunder and lightning are necessary; and he was well content to represent these agencies in the great work of reformation in the 16th century. Upon the whole, it may be said that history presents few greater characters—few that excite at once more love and admiration, and in which we see tenderness, humor, and a certain picturesque grace and poetic sensibility more happily combine with a lofty and magnanimous, if sometimes rugged sublimity.

Luther's works are very voluminous, partly in Latin, and partly in German. Among those of more general interest are his *Table-talk*, his *Letters*, and *Sermons*. De Wette has given to the public a copious and valuable edition of his *Letters*, which, along with his *Table-talk*, are the chief authority for his life. Many special lives of him, however, have been written, by Melanchthon, Michelet, Audin, and others.

LUTHERAN CHURCH in the United States (LUTHERANS, *ante*). The first Lutherans came to America in 1621 in company with the first Dutch emigrants to what is now New York. They were without ministerial guidance. In 1638 Swedish Lutherans, with a minister, settled at Wilmington, Del. Their second pastor translated Luther's smaller catechism into the language of the native tribes in the vicinity, commencing missionary labor among them soon after 1643, about the same time with John Eliot in Massachusetts. These Swedes afterwards united with the Protestant Episcopal church, under whose care the "old Swedes' church" in Wilmington still stands. There is a similar one in Philadelphia, popularly known by the same name, and in communion with the same denomination. The first German Lutheran settlers in this country also came to New York with the Dutch in 1644, and were at first without a minister. When numerous enough to support a pastor, the Dutch would not allow them to have one.

But under the English rule, having obtained religious liberty, they secured their first minister, Jacob Fabricius, in 1664, and a house of worship in 1671. This was rebuilt, in 1703, at Broadway and Rector street. In 1710, 4,000 Germans, fleeing from civil and religious oppression, settled in New York, Pennsylvania, and South Carolina. Another colony went to Georgia in 1734, and was much increased by a second company the following year. John and Charles Wesley, when they visited Georgia, found these Lutherans flourishing and useful. The German Lutherans of Philadelphia, having sent earnest requests for help to their brethren in England and the fatherland, Franke, the founder of the orphan house at Halle, persuaded Dr. Henry Melchior Muhlenberg to settle in America. His arrival in 1742 opened a new era in the progress of the American Lutheran church, of which, indeed, he was, in a great degree, the founder. When he came, finding no organization, he set himself to effect a union at least of German Lutherans. By exerting his influence in Germany, he induced a number of his friends to come to America, so that in 1748 he was able to form a synod, which afterwards met annually with very beneficial results. In 1749 an orphan asylum was established at Ebenezer, Ga.; in 1765 a private theological seminary was commenced; in 1787 the legislature of Pennsylvania founded Franklin college "for the special benefit of the Germans of the commonwealth, as an acknowledgment of services rendered by them to the state, and in consideration of their industry and public virtues;" and in 1791 the same legislature gave 5,000 acres of land to the free schools of the Lutheran church in Philadelphia. In 1785 the New York synod was formed; in 1803, that of North Carolina; in 1819, that of Ohio; and in 1820, that of Maryland and Virginia. In 1816 a public theological seminary was established at Hartwick, N. Y. During the revolution the Lutherans were zealous patriots, and, in consequence, incurred the dislike of the English. At the close of the war a large number of the German soldiers whom the British government had hired remained in this country and joined the Lutheran congregations. The growing acquaintance of the younger generations with the English language made them anxious to have part, at least, of the religious services conducted in it. The older persons, however, resisted the effort, some of them even believing that the German might become the language of the country. The first Lutheran church in which English was exclusively used was built in 1809, and it remained the only one for many years. In 1820 the general synod was formed, representing 135 ministers and 33,000 church members. The fresh arrival of Lutherans from Europe produced differences of opinion and disputes which resulted in several secessions from the main body. After the war of the rebellion the southern general synod was formed. A division on doctrinal grounds next occurred in the northern synods. While the Augsburg confession was cordially accepted by the general synod as a most important historical document, they did not regard a strict adherence to the letter of its teachings as essential to church membership, the privileges of which they wished to extend to all Lutherans. But the stricter party were dissatisfied with this liberal view, and, in 1864, the admission of the Frankean synod led to the withdrawal of the oldest organization—the synod of Pennsylvania—and, subsequently, to the formation of the general council.

STATISTICS AS GIVEN IN THE CHURCH ALMANAC FOR 1880:

	Ministers.	Congregations.	Members.
I. Synodical conference	1,150	1,875	436,000
II. General synod, north	840	1,217	125,000
III. General council	760	1,467	207,200
IV. General synod, south	100	175	13,300
V. Independent synods	165	490	43,500
Total, 58 synods	3,015	5,224	825,000

LUTHERANS, a designation originally applied by their adversaries to the reformers of the 16th c., and which afterwards was distinctively appropriated among Protestants themselves to those who took part with Martin Luther against the Swiss reformers, particularly in the controversies regarding the Lord's-supper. It is so employed to this day, as the designation of one of the two great sections into which the Protestant church was soon unhappily divided, the other being known as the *Reformed* (q.v.). To the end of Luther's life, perfect harmony subsisted between him and his friend Melanchthon; but already there were some who stood forth as more Lutheran than Luther, and by whom Melanchthon was denounced as a *Crypto-Calvinist* and a traitor to evangelical truth. After Luther's death, this party became more confident; and, holding by Luther's words, without having imbibed his spirit, changed his evangelical doctrine into a dry scholasticism and lifeless orthodoxy, while extreme heat and violence against their opponents were substituted in the pulpit itself for the zealous preaching of the gospel. The principal seat of their strength was in the university of Jena, which was founded in 1557 for this very object, and maintained their cause against Wittenberg. The utmost illiberality characterized this party; and in so far as governments came under their influence, extreme intolerance was manifested, the measures adopted against those who

differed from them being not unfrequently of a persecuting nature. No controversy was ever conducted with more bitterness than the *sacramentarian controversy* (q.v.).

Towards the end of the 17th c. the Lutherans of Germany found a new object of hostility in the *Pietists* (q.v.), against whom they stired up the passions of the multitude, and instigated the governments to severity.—In the 18th c. they came into conflict with *Rationalism* (q.v.), which may be regarded as a consequence of the state of things existing in Germany during the previous period of unprofitable theological strife.—When, after the wars of the French revolution were over, the Prussian government formed and carried into execution a scheme for the union of the Lutheran and Reformed churches into one national church (see PRUSSIA), an active opposition arose on the part of those who now began to be known as *old Lutherans*. Separate congregations were formed, and an attitude of open hostility to the government was assumed by some; while others, more moderate, but holding the same theological opinions, continued to maintain these opinions within the *United Evangelical church*. Among the latter were some of the most eminent divines in Germany, as Hengstenberg, Olshausen, Guericke, and Tholuck. The separatists were for some time severely dealt with by the government, and, consequently, many left their native country to found old Lutheran communities in America and Australia. This took place chiefly about the year 1837. After that time greater toleration was practiced, and now the old Lutherans form a legally recognized ecclesiastical body in Prussia. For some time after the political excitement of 1848, those who held the Lutheran doctrines within the national or United Evangelical church of Prussia, exhibited considerable uneasiness and a strong desire for a position more consistent with their ecclesiastical traditions; but more recently this feeling seems to have been considerably allayed.

Lutheranism is the prevailing form of Protestantism in Saxony, Hanover, and the greater part of northern Germany, as well as in Würtemberg; it also prevails to a considerable extent in other parts of Germany. It is the national religion of Denmark, Sweden, and Norway; and there are Lutheran churches in Holland, France, Poland, etc. Among the Lutheran symbolical books, the *Augsburg Confession* (q.v.) holds the principal place; but the supreme authority of the holy Scriptures is fully recognized. The chief difference between the Lutherans and the Reformed is as to the *real presence* of Christ in the sacrament of the supper; the Lutherans holding the doctrine of *consubstantiation*, although rejecting *transubstantiation* (see LORD'S-SUPPER; IMPANATION; and TRANSUBSTANTIATION); while some of their more extreme theologians have asserted not only the presence of the human nature of Christ in the Lord's-supper, as Luther did, but the absolute omnipresence of his human nature. Other points of difference relate to the allowance in Christian worship of things *indifferent* (*adiaphora*); and many of those things at first retained as merely tolerable by Luther and his fellow-reformers, have become favorite and distinguishing characteristics of some of the Lutheran churches—as images and pictures in places of worship, clerical vestments, the form of exorcism in baptism, etc. Among the old Lutherans of Prussia, particularly the separatists, a strong tendency to exaggeration in these distinctive peculiarities has manifested itself.

In many of the Lutheran churches, the doctrines of Luther, and of their symbolical books, have long given place, in a great measure, to Arminianism, and to a system of religion very inconsistent with Luther's doctrine of justification by faith. In some quarters, particularly in Norway and Sweden, a reaction has of late years appeared; and many of the Lutheran divines of Germany are strenuous supporters of the "evangelical" doctrines of the reformers.

In its constitution the Lutheran church is generally *unepiscopal*, without being properly *presbyterian*. In Denmark and Sweden there are bishops, and in Sweden an archbishop (of Upsal), but their powers are very limited. Where Lutheranism is the national religion, the sovereign is recognized as the supreme bishop, and the church is governed by consistories appointed by him, and composed both of clergymen and laymen. The members of congregations possess almost no rights.

LÜT'KE, FEODOR PETROVITCH, b.–1797; was educated for the Russian naval service. In 1817–19 an associate in a Russian expedition around the world, which made discoveries on the shores of Nova Zembla. From 1826 to 1828 he was engaged in explorations in Behring's straits, the sea of Kamtchatka, its connections, and its before unknown islands. In 1830 he made a voyage of scientific observation to ascertain the oscillations of the pendulum. He was made admiral in 1835, and was subsequently employed in conspicuous service. In 1855 he procured the establishment of the Russian geographical society, and in 1864 was president of the academy of sciences at St. Petersburg. His principal published work is his *Four Voyages Across the Arctic Seas* (St. Petersburg, 1824).

LU'TON, a market t. and parish of England, co. Bedford, situated 30 m. n.n.w. of London, on the river Lea, which rises in the parish. It is connected with the London and Northwestern and the Great Northern railways by branch-lines from Leighton Buzzard to Hatfield. Staple trade, straw-hat manufacture. Pop. '71, 17,317. The parish church, an ancient and noble structure, contains an elegant and perhaps unique baptismal font.

LUTRA. See OTTER, *ante*.

LUTTI, FRANCESCA, b. Riva di Trento, in the Italian Tyrol; is devoted to literature and philanthropy, and ranked among the first of Italian poets. Her works are *Novelle e Liriche* (2 vols.); *Alberto;* and *Un Proverbio.*

LÜTTRINGHAUSEN, a prosperous manufacturing t. of Rhenish Prussia, 18 m. s.e. from Düsseldorf. Woolen, linen, and cotton manufactures are carried on; also manufactures of hardware and cutlery. Pop. '75, 9,493.

LUTZ, JOHANN VON, 1826; b. Bavaria; Bavarian minister of justice, 1867–69, when he took the office of minister of public education and worship, in which he distinguished himself by his firm resistance to the ultramontanes.

LÜTZEN, a small t. of (1871) 2,647 inhabitants, in the Prussian province of Saxony, famous for two great battles fought in its vicinity. The first took place on $\frac{6}{16}$th Nov., 1632. Gustavus Adolphus, who had moved in the direction of Bavaria, being recalled from his designs of conquest there by the advance of Wallenstein on Saxony, united his forces with those of duke Bernard of Saxe-Weimar, and attacked the imperialists at Lützen. The fortune of the day was very various; but notwithstanding the death of Gustavus Adolphus, victory remained with the Swedes, and Wallenstein was compelled to resign to them the field of battle. About 9,000 men were killed and severely wounded.

The *battle of Lützen*, on May 2, 1813, was fought somewhat further to the s., at the village of Groszgörschen. It was the first great conflict of the united Russian and Prussian army with the army of Napoleon in that decisive campaign. The allies gained at first great successes, but the French were left in possession of the field at the close of the day; their superiority in numbers securing them the victory, although they lost about 12,000 men, and the allies only 10,000. By this battle, the French regained possession of Saxony and the Elbe.

LÜTZOW, LUDWIG ADOLF WILHELM, Baron von, 1782–1834; a German officer of the province of Brandenburg, made famous principally by the songs of Körner, especially *Lutzow's Wilde, Verwegene Jagd.* On the retreat of the French from Moscow he placed himself at the head of the students of the universities, who rose *en masse* under the title of the *Tugenbund*, and, as the black cavalry, first distinguished themselves at the battle of Lützen. It was their vigorous following of the retreating French army that received the name of "Lutzow's wild chase."

LUXEMBOURG, FRANÇOIS HENRI DE MONTMORENCY, Duke of, marshal of France, a famous gen. of Louis XIV., b. at Paris, Jan. 8, 1628; was the posthumous son of François de Montmorency, count of Bouteville, who was beheaded on account of a duel. His aunt, the mother of the great Condé, brought him up as a companion of her son, with whom he took part in the disturbances of the Fronde, signalizing himself in the battles then fought. Being afterwards received into favor by Louis XIV., he served as a volunteer under Turenne in Flanders (1667), in Franche Comté as the lieut.-gen. of Condé, and in the Netherlands, where the battles of Grool, Deventer, Zwoll, etc., greatly increased his reputation. He had, however, the misfortune to embroil himself in a quarrel with the all-powerful Louvois, the results of which were disastrous to his prospects for a time. He assumed the title of Luxembourg on marrying the heiress of that house. Some of his military exploits were very daring, and were executed with great skill; his retreat from Holland, in particular, being executed in such a masterly manner that it placed him among the foremost generals of his age: but he largely participated in the savage burning of towns, and desolating of conquered districts, which disgraced the French arms at that period, though it is believed that in this he only carried out the positive instructions which he received from Louvois (q.v.). In the campaign of 1677 he defeated the prince of Orange at Mont-Cassel, took St. Omer, and compelled the prince to raise the siege of Charleroi. After the peace of Nimeguen, Louvois attempted to accomplish his destruction by means almost incredible. Having got possession of a contract between Luxembourg and a wood-merchant, he caused it to be changed so that it became a contract with the devil. Upon this, Luxembourg was summoned before the *chambre ardente*, and obeyed the citation, although his friends advised him to leave the country. He was thrown into the Bastile, and there confined in a dark dungeon. After fourteen months, he was acquitted and released, but banished to one of his domains, where he lived forgotten for ten years, at the end of which time, the king appointed him to the command of the army in Flanders. On July 1, 1690, he gained a victory over the prince of Waldeck at Fleurus; on Aug. 4, 1692, and July 29, 1693, over William III. of England, at Steenkirk and at Neerwinden. He took Charleroi, Oct. 12, 1693. He died Jan. 4, 1695. Luxembourg was crooked in shape and feeble in body, but possessed an inexhaustible activity of spirit.

LUXEMBOURG PALACE, built at Paris in 1615 by order of Marie de' Médicis. It is in the style of the Pitti palace at Florence, and was sumptuously decorated by Debrosse, but afterwards altered by Chalgrin, the architect of the Arc de l'Étoile. Between 1621 and 1625 Rubens, who was commissioned to embellish the palace with paintings, painted, with the assistance of his pupils, those large pictures representing scenes from the queen's life which are now in the Louvre. The long gallery in which these paintings were originally hung still contains frescos by Jordaens,

the pupil of Rubens. The palace continued to be a royal residence down to the revolution, shortly before which it was presented by Louis XVI. to his brother, the count of Provence, afterwards Louis XVIII. The palace derives its name from the duke of Pliney-Luxembourg, whose mansion formerly occupied the site, and, although various other names have been proposed, none of them has ever been permanently adopted. In 1795 the building was named the Palais du Directoire, and afterwards the Palais du Consulat. During the first empire the palace was occupied by the senate, and styled Palais du Sénat-Conservateur. After the restoration and under Louis Philippe, the chamber of peers met here. In March and April, 1848, the *commission des travailleurs*, under Louis Blanc, held its socialist meetings in the palace. From 1852 to 1870 it was named Palais du Sénat, that body having again sat here during the second empire. Since 1871 it has been occupied by the offices of the préfet de la Seine. The Palais du Luxembourg, although its architecture is somewhat heavy, is one of the handsomest and most symmetrical buildings of Paris. The principal façade, which has been restored in conformity with the design of Debrosse, rises opposite the rue de Tournon. It is nearly 300 ft. in width, and consists of a central dome-covered pavilion and two wings, connected by galleries. It is adorned with Tuscan, Doric, and composite columns placed above each other. The *salle du trône* was adorned in 1856 with a series of large pictures representing scenes from the history of the Napoleons. The room adjoining is a gallery of busts of former peers and senators. The apartments of queen Marie de' Médicis were restored in 1817. The chapel was restored and richly decorated in 1842. The dome of the library is adorned with one of the finest works of Eugène Delacroix, representing Elysium as portrayed by Dante. The *musée du Luxembourg* occupies a room on the ground-floor of the palace. It contains a collection of works of living artists, consisting of paintings, sculptures, drawings, engravings, and lithographs. The works of the most distinguished masters are generally transferred to the Louvre about ten years after their death. To the n.e. of the palace, opposite the gate of the garden, rises the *théâtre de l'Odéon*, a heavy and unattractive edifice erected in 1818. The façade on the n. side is adorned with a Doric portico. On the three other sides are galleries occupied by book and newspaper stalls. The interior is well fitted up, and the chandelier is particularly handsome. The *foyer* is embellished with busts and portraits of dramatists and actors connected with the Odéon. The garden of the Luxembourg on the e. and s. sides of the palace contains the "fontaine de, Médicis," by Debrosse, in the Doric style, with imitations of stalactites; "Polyphemus surprising Acis and Galatea," by Ottin; an "Archidamas about to Throw the Disk," by Lemaire; and copies of the "Borghese Gladiator" and the "Diana" of Versailles. The terraces surrounding the parterre are embellished with 20 modern statues in marble of celebrated French women. A fountain designed by Carpeaux was erected in 1875 at the point where the garden formerly terminated. It is adorned with eight horses rising above the lower basin, and with a group of four figures bearing an armillary sphere. The place is called the *carrefour de l'observatoire*. The statue of Ney, to the left of the *carrefour*, stands on the spot where the marshal was shot in 1815, in execution of the sentence pronounced by the chamber of peers on the previous evening. The statue is in bronze by Rude, and was erected in 1853. On the sides of the pedestal are inscribed the names of the battles at which the marshal was present. The *observatoire* is situated at the end of the avenue of that name. This celebrated institution was founded in 1672. The meridian of Paris runs through the center of the building, and the latitude of the s. façade is held to be that of Paris. The copper dome, which is 42 ft. in diameter, is constructed so as to revolve round its vertical axis for the purpose of adjusting the great equatorial which it contains. The observatory also has a new telescope, which cost 200,000 francs.

LUX'EMBURG, an old German co., and afterwards a duchy, which, about the 12th c., came into possession of the counts of Limburg, who assumed the title of counts of Luxemburg. It was next acquired by Burgundy, and in this way came into the hands of Austria. By the peace of Campo Formio (q.v.), it was ceded to France in 1797. In 1814 it was elevated to the rank of a grand duchy of the German confederation, and given to Holland in compensation for the loss of Nassau. In 1830, when Belgium formed itself into an independent kingdom, Luxemburg was divided between it and Holland—the latter, however, retaining little more than the fortress of Luxemburg, till 1839, when, by a treaty signed in London, a new division was made more favorable to Holland.—BELGIAN LUXEMBURG, or LUXEMBOURG, the largest province of Belgium, forming the s.e. corner of the country, contains an area of 1690 English sq.m., with a pop. (1873) of 206,069. It is traversed from s.w. to n.e. by a branch of the Ardennes, which nowhere exceed 2,000 ft. in height. The surface is in general extremely rugged, much covered with woods and morasses. The soil is poor. About a third of the arable land is devoted to pasture, great numbers of cattle, sheep and horses being reared for export. The horses are a strong, hardy breed, much prized both for agricultural and military purposes. The mineral wealth of the country consists of iron, lead, copper, marble, freestone, slate, gypsum, etc. The chief manufactures are cloth, tulle, earthenware, leather, nails, and potash; and the principal articles of export are hemp, flax, oak-bark, timber, iron, leather, cheese, etc. The cap-

ital of the province, Arlon, has a pop. of 4,200.—DUTCH LUXEMBURG, e. of the Belgian province of Luxemburg, is connected with the Netherlands in the person of the sovereign, but has a constitution and administration of its own. The king of Holland, as grand duke, appoints a deputy-governor. Dutch Luxemburg was a part of the Germanic confederation from its formation in 1815 till its dissolution in 1866. In 1867 its neutrality was guaranteed by the great powers. Its present constitution dates from 1868. The chamber of deputies consists of 40 members, chosen for 6 years by direct vote in the electoral districts. Area, 990 English sq.m.; pop. '71, 197,528, the most of whom are engaged in agriculture. The chief products are wine, corn, hops, hemp, and flax. In the eastern districts there are iron mines, and lime and slate quarries. The majority of the inhabitants are Walloons, the rest mainly Germans. The capital is Luxemburg. By a law of 1868 the army consists of 13 officers, 500 under-officers and privates, besides 122 gendarmes.

LUXEMBURG, the capital of Dutch Luxemburg, is situated on the Else or Alsette, 76 m. s. by e. from Liege, and possessed a pop., in '71, of 14,440. Its situation has often been compared to that of Jerusalem, being, like the latter, surrounded by escarped rocks, which, excepting the w. side, average 200 ft. in height. The Spaniards, Austrians, French, and Dutch, who successively held possession of the town, so increased and strengthened its fortifications that in the beginning of the 19th c. it was considered to be, with the exception of Gibraltar, the strongest fortress in Europe. Another portion of Luxemburg, called the "low town," is situated at the foot of the precipice, along the banks of the river. It possesses a fine cathedral, various handsome buildings, and public institutions. It has also manufactures of wax, distilleries, breweries, tanneries, and an extensive general trade. It was formerly garrisoned by Prussian troops; but by the treaty of London of 1867, these were withdrawn, and the fortifications demolished.

LUXOR, in upper Egypt. See THEBES, *ante*.

LUYNES, HONORÉ THÉODORIC PAUL JOSEPH D'ALBERT, Duc de, 1802–67; son of Mme. de Chevreuse, whose too plainly expressed contempt for some of the faults of the court of Napoleon I. caused her dismissal on two different occasions. Her son first turned to archæological studies by the discovery of the remains of the Greek city of Metapontum on one of his father's estates in Italy. On the accession of Louis Philippe in 1848 he became a member of the constituent assembly, and in 1849 of the legislative assembly. In 1851 he was one of the parties arrested by Louis Napoleon in the *coup d'état*, though not a republican. In 1864 he pursued archæological studies in Syria and Palestine, which were the basis for the work of his grandson, entitled *Voyage d'Exploration à la Mer Morte, à Palmyre, à Petra, et sur la rive gauche du Jourdan.*

LUZAC, JEAN, 1746–1807; a Dutch philologist, and one of the editors of the *Leyden Gazette*, a journal of large influence controlled by his family since 1738. He was a friend and correspondent of Washington, John Adams, and Jefferson, and for a time directed the education of John Quincy Adams. He was Greek professor of the university of Leyden at the close of the last century. His lectures on Greek history were considered too republican, and caused him to be suspended from his position for a time. In 1809 his lecture in defense of Socrates—*Lectiones Attica*—was published in Leyden.

LUZENBERG, CHARLES ALOYSIUS, 1805–48; b. Verona, Italy; entered college by special permission when but 10 years of age; emigrated to the United States in 1819; attended lectures in the Jefferson medical college in Philadelphia; in 1829 removed to New Orleans, where he was attached for a time to the charity hospital, and afterwards established one of his own, in which he performed many difficult surgical operations. He was in Europe 1832–34, and was elected a corresponding member of the Paris academy. He returned to Louisiana in 1834; founded the society of natural history in 1839, and the Louisiana medico-chirurgical society in 1843, and was the first president of both. Died in Cincinnati.

LUZERN. See LUCERNE, *ante*.

LUZERNE, a n.e. co. of Pennsylvania, drained by the Lehigh river and Nescopeck creek, and intersected by a branch of the Susquehanna; traversed by the Lehigh Valley, Central of New Jersey, and Lackawanna and Bloomsburg railroads; 850 sq.m.; pop. '80, 133,036. It is heavily wooded, and the scenery is varied and picturesque, comprising, among other features, the charming Wyoming valley. The soil is fertile, the productions including hay, Indian corn, lumber, oats, wheat, butter, and cattle. This county has a larger coal product than any other in the United States, the larger part of the mineral (anthracite) lying in the Wyoming and Lackawanna valleys. In 1870 the coal exportation of the county was nearly 10,000,000 tons. Co. seat, Wilkesbarre.

LUZERNE, CHEVALIER ANNE-CÉSAR DE LA, LL.D., 1741–91; a French gen., and ambassador to the United States from 1779 to 1783. His services to the United States won the gratitude of the nation during its struggle for independence. Luzerne co., in Pennsylvania, was named in his honor. In 1780 he lent his own private credit to obtain a loan for the relief of the American army, and congress voted him the thanks of the nation, which was reiterated by request of gen. Washington in 1789. He died while ambassador at London.

LUZON, the largest of the Philippine islands (q.v.).

LU'ZULA, a genus of plants of the natural order *juncæ*, differing from rushes in having a 3-seeded instead of a many-seeded capsule, and in having soft plane leaves, which are generally covered with thinly scattered longish hairs. They do not grow in wet places, like rushes, but in woods, pastures, and elevated mountainous situations. The English name, WOOD-RUSH, has sometimes been given to the whole genus, but is only appropriate to some, of which it is the popular name, as *L. sylvatica* and *L. pilosa*, common British species. Perhaps there is no more common British plant than the FIELD-RUSH (*L. campestris*), a plant of very humble growth; the flowering spikes of which, congregated into a close head, their dark color relieved by the whitish yellow of the anthers, profusely adorn dry pastures in spring. It is of little agricultural value. The species which grow under the shade of trees are valuable, as preserving their verdure in winter, adding to the beauty of the scene, and improving the cover for game.

LUZZATTO, MOSE CHAYIM, 1707–47; b. Italy; a Jewish mystic, who devoted himself to the study of Hebrew literature, especially the cabalistic writings. Having declared himself the Messiah, he was excommunicated, and took refuge in Holland, but afterwards removed to Palestine, where he died. He published a second book of the *Zohar*.

LUZZATTO, SAMUEL DAVID, 1800–65; b. Italy; a distinguished Jewish scholar, and professor of biblical exegesis in the rabbinical school at Padua from its foundation in 1829 till his death. He published *Dialogues on the Cabala, the Zohar*, etc.; a *Hebrew Grammar; Hebrew Notes on the Pentateuch; French Notes on Isaiah;* an Italian translation of Job; and of Isaiah, with a commentary in Hebrew.

LYCANTHRO'PIA (Gr. *lycos*, a wolf; *anthropos*, a man), wolf-madness. There has been, in various countries and times, a popular superstition and dread that men had been transmuted into wolves by Satanic agency, and roamed through forests and desert places actuated by the same appetites as the wild beast whose aspect or name they bore. The panic thus inspired may have suggested the delusion now under consideration, where the process of transformation was purely subjective, and the transforming power disease. Many instances occur, and may be encountered in every asylum, in which the insane conceive themselves dogs (*cynanthropia*) and other animals, and even inanimate objects; but these are solitary cases, whereas this hallucination has appeared epidemically, and lycanthropes have literally herded and hunted together in packs. In 1600 multitudes were attacked with the disease in the Jura, emulated the destructive habits of the wolf, murdered and devoured children; howled, walked, or attempted progression upon all-fours, so that the palms of the hands became hard and horny; and admitted that they congregated in the mountains for a sort of cannibal or devil's sabbath. Imprisonment, burning, scarcely sufficed to check what grew into a source of public danger. Six hundred persons were executed on their own confession. Cases in which the sufferer boasts of being a wolf, creeps like a quadruped, barks, leaps, bites, and which in other respects are closely allied to these, still happen in sufficient frequency to suggest the lesson that we are chiefly protected from the prevalence of such a moral pestilence by education, the greater diffusion of knowledge and sound principle, and by attention to the laws of health.—Calmiel, *De la Folie;* Arnold, *On Insanity*.

LYCAON, legendary king of Arcadia, son of Pelasgus and Melibæa, or Cyllene. He had many sons, some say fifty, others only twenty-two. According to the tradition of the Arcadians, he first introduced the worship of Zeus as the supreme being, founding Lycosena on the top of Mt. Lycæus. It is said that he offered human beings on the altars of Zeus. Jupiter, hearing of the impiety of Lycaon and his sons, came down to examine the truth of the report. They placed before him part of the body of a child dressed for dinner, when Zeus in horror and indignation struck with lightning the father and sons, except Nyctimus. Another account is that for their impiety they were changed into wolves. Some say that the flood of Deucalion, which occurred soon after, was in consequence of the crimes of Lycaon's sons.

LYCAON, a genus of *canidæ*, in dentition and general osteological structure nearly agreeing with dogs, but resembling hyenas in the form of the head and in having only four toes on each foot. The best ascertained species, *L. venaticus*, the WILD DOG, HYENA DOG, or HUNTING DOG of the cape of Good Hope, is rather smaller than a mastiff, and has a tall gaunt form. It is gregarious, and still infests even the neighborhood of Cape Town, committing great depredations on flocks of sheep. It is found over great part of Africa, from the cape of Good Hope to the valley of the Nile.

LYCAO'NIA, in ancient geography, a country in Asia Minor, bounded on the e. by Cappadocia, on the n. by Galatia, on the w. by Pisidia, and on the s. by Isauria and Cilicia. Its capital was Iconium (q.v.).

LYCE'UM, (Gr. *Lukeion*), originally the name of a place in the immediate neighborhood of Athens, consecrated to *Apollo Lyceius*, and noted for its shady wood and beautiful gardens, but particularly for its gymnasium, in which Aristotle and the Peripatetics taught, and from which the Romans borrowed the same name for similar institutions. In more modern times, the name lyceum was given in honor of Aristotle to the higher Latin schools in which the Aristotelian philosophy formed a principal branch of education; and at the present day, the name is variously applied to educational and literary institutions.

LYCH-GATE (Ang.-Sax. *lic* or *lice*, a body, corpse), or CORPSE-GATE, a churchyard gate covered with a roof. It is very common in many parts of England. The bodies of persons brought for burial are set down under the shelter of the roof while the service is read. Lych-gates are very rare in Scotland. There is one at Peebles.

LYCH'NIS, a genus of plants of the natural order *caryophyllaceæ;* having a tubular 5-toothed calyx; corolla twice as long as the calyx, with a spreading wheel-shaped limb, crowned at the mouth of the tube, and generally divided at the border; ten stamens, and five styles. The species are herbaceous plants, generally perennial, natives of temperate countries. Several are found in Britain. The RAGGED ROBIN (*L. flos-cuculi*) is one of the most frequent ornaments of meadows and moist pastures; the GERMAN CATCHFLY (*L. viscaria*), very rare, and generally found growing on almost inaccessible precipices; the RED CAMPION (*L. diurna*), and the WHITE CAMPION (*L. vespertina*), abound in fields, hedges, and the borders of woods. The last two are dicœcious, and, strangely enough, the female of the first and the male of the second are very common, while the male of the first and female of the second are rather rare. The flowers of *L. vespertina* are usually fragrant in the evening. The SCARLET LYCHNIS (*L. Chalcedonica*), a native of Asia Minor, is a frequent and brilliant ornament of flower-borders. Some of the species have saponaceous properties.

LY'CIA, a country on the s. coast of Asia Minor, extending towards Mt. Taurus, and bounded on the w. by Caria, and on the n. by Phrygia and Pisidia, and on the e. by Pamphylia. The most ancient inhabitants are said to have been two Semitic races called the *Solymi* and *Termilæ*, the former of whom were driven from the coast to the mountains in the n. by adventurers from Crete, under the command of Sarpedon, a brother of Minos, who first gave the country the name of Lycia. To what race the invaders belonged, is not certain; they were, however, not of Hellenic origin. The Lycians are prominent in the Homeric legend of the Trojan war. It shared the vicissitudes of the other states of Asia Minor, becoming subject to the Persian and Syrian monarchies, and then to Rome. During the time of its independence, it consisted of 23 confederate cities, of which the principal were Xanthus, Patara, Pinara, Olympus, Myra, and Tlos; and at the head of the whole confederation was a president or governor called the Lyciarch. Many monuments and ruined buildings (temples, tombs, theaters, etc.), exquisite sculptures, coins, and other antiquities, testify to the attainments of the Lycians in civilization and the arts, in which they rival the Greeks themselves. These antiquities, however, had received little attention, till sir Charles Fellows, about the year 1840, pointed out their interesting character. Since that time they have been very assiduously explored and studied. A beautiful collection of Lycian sculptures, made by sir Charles, is now to be seen in the British museum. The most interesting of all the antiquities of Lycia are, however, the inscriptions in which a peculiar alphabet is used, nearly allied to the Phrygian, and the language of which appears to be an Indo-Germanic language, mingled with Semitic words. Grotefend, Sharpe, Daniell, and others have spent much labor in deciphering these inscriptions.

LYCOMING, a co. in n. Pennsylvania, intersected centrally by Lycoming creek, watered also by Loyalsock creek in the s. and Pine creek with its branches in the w., all affluents of the w. branch of the Susquehanna river; 1250 sq.m.; pop. '80, 57,482—52,725 of American birth, 970 colored. Its surface is mountainous, particularly in the s. and w. sections, where it rises into a range of the Alleghany mountains, presenting very attractive scenery. Its surface is largely covered with forests of hard wood, and timber is one of its chief commodities. Its soil in the valleys is fertile, and produces every variety of grain, tobacco, wool, dairy products, honey, and maple sugar. Cash value of farms in '70, $11,212,366, numbering 2,640. Value of live stock in '70, $1,244,900. It had in '70, 608 manufacturing establishments, with a capital of $7,875,938, and an annual product of $9,081,406. Among its mineral products are black marble, limestone, iron, and coal. It had in '70, one coal mine, employing 30 hands, with a capital of $185,000, and an annual product of $4,000. Its manufactures are represented by machine shops, lumber, flour, and paper mills, plow factories, tanneries; also manufactories of pumps, wagons, chairs, sashes, doors, and blinds, clothing, rectified coal oil, extract of hemlock bark. Near its county seat, above a suspension bridge that spans the stream, is the great Susquehanna boom, coasting $1,000,000, which will hold 300,000,000 ft. of lumber. It is traversed by the Northern Central railway, the Muncy Creek railroad, the Philadelphia and Erie, the Catawissa and Williamsport railroad, and the West Branch canal, the latter principally used in the transportation of coal. Seat of justice, Williamsport.

LYCON, a Greek philosopher; B.C. 300–226; b. in Laodicean Phrygia. He was a philosopher of the school of Aristotle, was at the head of that sect B.C. 270, and succeeded Aristotle, Theophrastus, and Strato in the school which they had taught at Athens. He is described as a very successful instructor, discarding corporal punishment, and inciting the pupil by appealing to his honor. His eloquence was so persuasive and melodious that his contemporaries prefixed the letter G to his name, making it *Glycon*, which denotes *sweetness*. He conducted the school with great ability for 42 years. From Cicero we learn that he wrote on the boundaries of good and evil, and a work of his on the nature of animals is quoted by Apuleius.

LYCOPERDON. See PUFF-BALL.

LYCOPHRON, a distinguished poet and grammarian; b. Chalcis in the island of Eubœa, B.C. 280. We know but little of his private history. He lived at the court of Ptolemy Philadelphus, where he was one of the seven poets, known by the name of *Pleiad*. He wrote many tragedies, of which Suidas has preserved the titles of 19, but the works are lost, except *Cassandra* or *Alexandra* of 1474 lines. This is, however, hardly a drama, as Cassandra is the only speaker. She gives an account of nearly all the leading events in Greek history. It is written in iambic in a style very obscure, and has no poetical merit. The best edition is by Bachman. He is said to have written also some satires and comedies.

LYCOPODIACEÆ, a natural order of acrogenous or cryptogamous plants, somewhat resembling mosses, but of higher organization, and by many botanists included among ferns as a sub-order. They have creeping stems and imbricated leaves. The axis consists entirely, or in great part, of annular vessels; the leaves are narrow and 1-nerved. The *thecæ*, or spore-cases, are axillary, sessile, 1 to 3 celled, opening by valves, or not at all, and often of two kinds, the one containing minute powdery matter, the other sporules of much larger size, which are capable of germinating. The powdery particles have by some been regarded as *antheridia* (see ANTHERIDIUM), but the question of their nature is still involved in uncertainty. The lycopodiaceæ are most abundant in hot humid situations, especially in tropical islands, although some are found in very cold climates. About 200 species are known. The only British genus is *lycopodium*, of which 6 species are natives of Britain. The most abundant, both in Britain and on the continent of Europe, is the common CLUB-MOSS (*L. clavatum*), which creeps upon the ground in heathy pastures, with branching stems, often many feet long. A decoction of this plant is employed by the Poles to cure that frightful disease the *plica polonica*. The yellow dust or meal which issues from its spore-cases, and from those of *L. Selago*, is collected and used for producing the lightning of theaters, being very inflammable, and kindling with a sudden blaze when thrown upon a candle, the combustion taking place so rapidly that nothing else is liable to be kindled by it. It is called *lycopode* and *vegetable brimstone*, and by the Germans, *lightning-meal* and *witch-meal* (*Blitz-mehl* and *Hexen-mehl*). It is used for rolling up pills, which, when coated with it, may be put into water without being moistened. It is sprinkled upon the excoriations of infants, and upon parts affected with erysipelas, herpetic ulceration, etc. It is even used, although rarely, as a medicine in diseases of the urinary organs. The powder of other species is also regarded in Brazil and other countries as possessing power over the urinary and generative organs. The stems and leaves of *L. clavatum* are emetic, those of *L. Selago* cathartic; a South American species, *L. catharticum*, is violently purgative, and is administered in cases of elephantiasis. *L. Selago* is employed by the Swedes to destroy lice on swine and other animals. *L. alpinum* is used in Iceland for dyeing woolen cloth yellow, the cloth being simply boiled with a quantity of the plant and a few leaves of the bog whortleberry. *L. complanatum* is used for the same purpose in Lapland, along with birch-leaves. Many of the lycopodiaceæ are very beautiful plants, and are much cultivated in hot-houses, green-houses, and fern-cases, in which they grow very luxuriantly.

LYCURGUS, a celebrated Spartan lawgiver, whose history and legislation are involved in so much obscurity, that many modern critics have suspected them to be mythical. The account usually given is as follows: Lycurgus, who flourished about 880 B.C. (or, according to others, about 1100 B.C.), was descended from the old Doric family of the Proclidæ. His brother, Polydectes, king of Sparta, died, leaving his widow with child. This ambitious woman proposed to Lycurgus that he should marry her, in event of which she promised to destroy the fruit of her womb. Lycurgus was shocked, but feigned consent in order to save his brother's offspring. As soon as the child, who was named Charilaus, was born, he proclaimed him king, and became his guardian. At this time, Sparta is represented as being in a state of great disorder and demoralization —the different sections of the community quarreling among themselves for political supremacy. Lycurgus after some years left his native country, and traveled through many foreign lands—Crete, Asia Minor, India, Egypt, Libya, and Iberia—examining and comparing the political constitutions of the different countries, and finally returned to Sparta, full of knowledge fitting him to become one of the greatest legistators in the world. During his absence, things had got much worse in Sparta, and he had no sooner arrived than the entire community requested him to draw up a constitution for them. To this he consented, and having induced them to solemnly swear that they would make no change in his laws till he came back, he again left Sparta, and was never more heard of. By this mysterious self-expatriation, he hoped to make the Spartan constitution eternal. The people now saw that he was a god; a temple was erected in his honor, and annual sacrifices were ever afterwards offered to him. No critical scholar considers such a biography historical; the most that can be assumed as probable is, that a certain Lycurgus may have once existed, who at some critical juncture in Spartan affairs may have been selected, probably on account of his wisdom and reputation, to draw up a code of laws for the better government of the state. To represent the entire legislation of Sparta as invented (so to speak) by Lycurgus, and imposed upon the people as a novelty, is simply incredible; the only theory worth a moment's consideration is that which supposes

him to have collected, modified, improved, and enlarged the previously existing institutions of Sparta (q. v.).

LYCURGUS, B.C. 400–323; b. Athens; was one of the renowned orators of Greece. In his early years he studied philosophy under Plato, and the political constitution of his country under Isocrates. In 343 B.C. he took an active part in political affairs, and was one of the ambassadors with Demosthenes appointed to counteract the intrigues of Philip in different parts of Greece. He was appointed to preside over the public revenue for four years, and so much confidence had the people in his integrity that he was continued in the office for 12 or 15 years. Lycurgus was one of the 10 orators demanded by Alexander after the destruction of Thebes, but the Athenians refused to give him up. He was buried in the Academia. Fifteen years after his death, upon the ascendency of the democratic party, a decree was passed by the Athenians that public honors should be paid him; a brazen statue of him was erected in the Ceramicus, and the representative of his family was allowed the privilege of dining in the Prytaneum. The monument recited his uncorrupted fidelity. Many persons confiding in his honesty intrusted to his custody large sums of money. Böckh considers him the only statesman of antiquity who had a real knowledge of the management of finance. He greatly increased the revenue, erected many public buildings, completed the docks, the armory, and the theater of Bacchus. After the defeat of the Greeks at Cheronea, 338 B.C., he caused the prosecution and condemnation of Leocrates, an Athenian general, for abandoning Athens after the battle, and settling in another Grecian state. In the time of Plutarch and Photius 15 of his orations were extant; but the only one preserved is that against Leocrates.

LYDDA, a t. of Palestine, in the tribe of Ephraim, 9. m. e. of Joppa, on the road between that place and Jerusalem. It is called in the Old Testament and the Apocrypha, Lod, and was built by the Benjamites. In the New Testament it is noticed as the place where Peter healed Æneas. Some years later it was burnt by Cestius Gallus in his march against Jerusalem. Rebuilt, it was at the head of one of the toparchies of the later Judea. It is described by Josephus as being at that time equal to a city, and the rabbins speak of it as a seat of Jewish learning. It was afterwards destroyed by Vespasian, but rebuilt by Hadrian and called Diospolis, under which name it occurs on the coins of Severus and Caracalla. It was a well-known and much frequented place in the time of Eusebius, 320–30. It was early the seat of a bishopric. In 415 a council of 14 bishops was held here, before which Pelagius was accused of heresy, but acquitted. The last bishop of Lydda was Apollonius. The celebrated St. George is said to have been born at Lydda, and suffered martyrdom at Nicomedia under Diocletian and Maximilian at the end of the 3d c.; it was reported that his remains were transferred to Lydda, and that a church was erected in his honor by the emperor Justinian. This church having been destroyed by the Moslems, was rebuilt by the crusaders, who established a bishopric of Lydda and Ramleh. The crusaders invested St. George with the dignity of their patron, and he thus became the patron saint of England and other states and kingdoms. The church was destroyed by Saladin in 1191, the ruins of which are in the eastern part of the town. The western part of the church has been built into a large mosque. As the city of St. George it is held in great honor by the Moslems. From the time of Saladin but little notice is taken of it by travelers. It is in a fruitful plain, 3 m. e. of Jaffa, under the name of Ludd, or Lidd, and, for a Mohammedan town, has some activity in business.

LYDGATE, JOHN, 1375–1460; b. England; educated at Oxford and ordained in 1397. He traveled on the continent and studied Italian and French literature, particularly the works of Dante, Boccaccio, and Alain Chartier. On his return to England he opened a school in his monastery. He was not only a *belles-lettres* scholar, but familiar with theology, philosophy, and astronomy. His poetical writings are voluminous, and we may mention *The History of Troy*, *The Story of Thebes*, and *The Fall of Princes*, the latter a translation from a French version of Boccaccio's *De Casibus Vironem Illustrium*. The *History of Troy* or *Troye-Book* is a paraphrase of Guido de Colonna's *Historia Trojana*. A collection of his minor poems edited by J. O. Halliwell, was published by the Percy society in 1840.

LYD'IA, anciently a country of Asia Minor, bounded on the w. by Ionia, on the s. by Caria, on the e. by Phrygia, and on the n. by Mysia. It is said to have been originally inhabited by a people called Mæonians (whether of Semitic or Indo-Pelasgic origin is much disputed by modern ethnographers), who were subdued or expelled by the Lydians (about 720 B.C.), a Carian race. The country was mountainous in the s. and w. —the principal range being that of Tmolus. It was celebrated for its fruitful soil and for its mineral wealth, particularly for the gold of the river Pactolus and of the neighboring mines, but was infamous for the corruption of morals which prevailed amongst its inhabitants, and especially in Sardis (q.v.), its capital. Lydia attained its highest prosperity under the dynasty of the Mermnadæ (*circa* 700–546 B.C.). The first of this dynasty was the half-mythical Gyges (q.v.)—the last was the famous Crœsus (q.v.), celebrated for his prodigious wealth. The subsequent history of Lydia is unimportant. Its antiquities have not yet been sufficiently explored. Compare Niebuhr's *Lectures on Ancient History*, Hamilton's *Researches*, and Menke's *Lydiaca, Dissertatio Ethnographica*.

LYDIAN MODE, one of the ancient Greek authentic modes in music, which was retained as one of the old church modes, the notes being F, G, A, B, C, D, E, F, the same as in our modern diatonic scale. Since the reformation the melodies in the Lydian mode have entirely disappeared, and the Lydian mode is used only occasionally in modulation from other modes.

LYDIAN STONE, a variety of flinty slate, but less hard than common flinty slate, and not of a slaty structure. It occurs in Britain and in many other countries, but was first brought from Lydia. It is generally grayish black, or quite black and velvet-like. It is polished and employed as a touchstone for trying the purity of gold and silver by comparison of colors.

LYE, a term sometimes used to denote all solutions of salts, but more generally appropriated to solutions of the fixed alkalies, potash and soda, in water. The solutions of caustic potash and soda are called caustic lyes; those of their carbonates, mild lyes. The fluid which remains after a substance has been separated from its solution by crystallization is called the *mother lye.*

LYELL, Sir CHARLES, an eminent geologist of the 19th c., was the eldest son of Charles Lyell, esq., of Kinnordy, Forfarshire. He was born in 1797, and after receiving his early education at Midhurst, in Sussex, was entered at Exeter college, Oxford, where he graduated as B.A. in 1819. Here he attended the lectures of Buckland, and thus acquired a taste for the science he afterwards did so much to promote. After leaving the university he studied law, and in due time was called to the bar; but his circumstances not rendering a profession necessary for a livelihood, he soon abandoned the law and devoted himself to the prosecution of geology. To extend his knowledge in this department of science he made geological tours in 1824, and again in 1828–30, over various parts of Europe, and published the results of his investigations in the *Transactions of the Geological Society* and elsewhere. The first volume of his great work, *The Principles of Geology,* appeared in 1830, the second in 1832, and the third in 1833. A third edition of the whole work appeared in 1834, a fifth in 1837, and the tenth was published in 1868. This work was divided into two parts, which have been subsequently published as two distinct works—viz., *The Principles of Geology; or the Modern Changes of the Earth and its Inhabitants, as illustrative of Geology,* which has now reached its ninth edition; and *The Elements of Geology; or the Ancient Changes of the Earth and its Inhabitants, as illustrated by its Geological Monuments,* of which the sixth edition was published in 1865. *The Geological Evidences of the Antiquity of Man, with Remarks on Theories of the Origin of Species by Variation,* took a large proportion of the public very much by surprise in 1863—creating as it did the sensation of the season in the literature of science. The fourth edition of this remarkable work, enlarged and greatly improved, appeared in 1873. Lyell also published *A First and Second Visit to North America, Canada, Nova Scotia, etc., with Geological Observations,* in 4 vols., besides a number of important geological papers in the *Proceedings and Transactions of the Geological Society, the Reports of the British Association,* etc. Lyell was one of the early members of the geological society, and on the opening of King's college in 1832 he was appointed professor of geology, an office which he soon resigned. In 1836 and again in 1850 he was elected president of the geological society, and in 1864 president of the British association. He was knighted in 1848, and created a baronet in 1864. Lyell received the degree of D.C.L. from Oxford, and that of LL.D. from Cambridge. He died in 1875.

LYGO'DIUM, a genus of climbing ferns; fronds twining or climbing, bearing stalked and variously-lobed divisions in pairs, with free veins; fructification upon separate divisions, narrower than those which are sterile, and bearing upon the back two rows of scale-like inclusiæ, each of which generally covers only a single spore-case, which has a ring at the apex and opens by a longitudinal slit. There are several species which are natives of warm countries. Only one species is found in North America from Massachusetts to Kentucky, south of which it is rare, and much more abundant in Kentucky than eastward. The fronds are from one to four ft. high, and spring from slender running root-stocks, climbing upon other plants. It is a very delicate and graceful fern, and is much used for ornamental purposes, both fresh and dried. It grows in shaded or moist grassy places. A favorite locality is East Windsor hill, Conn., also the vicinity of Hartford, and of Springfield, Mass.

LYLY, JOHN, an English dramatist, b. in Kent about 1554; studied at Magdalen college, Oxford, and took his degree of M.A. in 1575. Of his career nothing is known except that he lived in London, and supported himself by his pen. He died early in the 17th century. Lyly wrote nine plays, most of which are on classical subjects—as *Sappho and Phaon, Endymion, Midas, Galathea,* and the *Maid's Metamorphosis*—the lyrics of which frequently display a sweet and graceful fancy; but the two works which have chiefly perpetuated his name are *Euphues, or the Anatomy of Wit,* and *Euphues and his England.* They are written in prose, and are marked by great affectation, bombast, and pedantry in the language and imagery; yet Lyly is said to have intended them for models of elegant English, and such the court of Elizabeth at least undoubtedly thought them. According to Lyly's editor, Blount, "that beauty at court which could not parley euphuism, that is to say, who was unable to converse in that pure and

reformed English which he had formed his work to be the standard of, was as little regarded as she which now there speaks not French."

LYMAN, a co. in s. Dakotah, having the Missouri river for its e. border, is watered by the White river and its branches, emptying into the Missouri; 700 sq.m.; pop. '80 (combined with a part of Aurora, Buffalo, and Presho counties), 232. It is largely taken up by Indian reservations, but much of it is rich bottom lands, with excellent grazing pastures on the bluffs, and a large proportion of good prairie land. It is well timbered for that section of the country.

LYMAN, CHESTER SMITH, b. Manchester, Conn., 1814. Becoming interested as a boy in astronomy and the kindred sciences, he studied them without a master, constructing for himself optical and astronomical apparatus, making almanacs for 1830 and 1831, and computing eclipses 15 years in advance. He graduated at Yale in 1837, and, after teaching two years, studied theology at the Union seminary (New York) and the Yale divinity school; was pastor of a Congregational church in New Britain, Conn., 1843–45; on account of failing health in 1845 went to the Sandwich Islands, where he taught the royal school, having as pupils four young men who afterwards successively occupied the Hawaiian throne. He went to California in 1847, whence he sent to the eastern states some of the earliest authentic accounts of the discovery of gold. In 1850 he settled in New Haven, engaging in scientific pursuits. He was one of the revisers of Webster's *Dictionary* (edition of 1864), taking charge especially of scientific words. In 1859 he became professor of industrial mechanics and physics in Yale college, taking an active part in organizing the Sheffield scientific school, in which he was the astronomical teacher. He has been a contributor to the *American Journal of Science*, the *New Englander*, and other periodicals, and is the author of various useful inventions, among which are a wave apparatus and a pendulum apparatus for acoustic curves. He is a member of various scientific bodies; among them, the British association for the advancement of science.

LYMAN, HENRY, 1810–34; b. Mass.; graduated Amherst college, 1829; Andover theological seminary, 1832; studied medicine at Boston and at Brunswick, Me.; sailed with the rev. Samuel Munson from Boston, 1833, as a missionary of the American board, with instructions to explore the Indian archipelago. They landed at Batavia in September; in April, 1834, they visited Padang, the Battoo group, Pulo Niyas, and Sumatra. Here they undertook to reach the Battas of the interior. They were dissuaded on account of rumors of war, dangers from wild beasts, and other hardships of the journey; but proceeded on foot with a few native attendants. Five days brought them to the village of Sacca, which was at war with a neighboring village. Before they could explain their errand they were surrounded by 200 armed men, and notwithstanding that they gave up the arms which they had taken for defense against wild beasts, Mr. Lyman was shot and Mr. Munson pierced with a spear. When the people of the neighboring villages learned by the reports of natives on the road that the strangers were good men who sought to benefit the Batta people, they combined to avenge their death, and surprised and destroyed the village of Sacca, killing many of the inhabitants. The report that the bodies of these missionaries were eaten is thought to be incorrect. Mr. Lyman published *Condition of Females in Pagan Countries*. Among the Battas whose country the martyrs attempted to explore, the Rhenish missionary society established a mission in 1861, which now has eleven stations and 1500 baptized converts.

LYMAN, PHINEAS, 1716–75; b. Conn.; educated at Yale, and admitted to the bar. Appointed commander-in-chief of the Connecticut forces in the French war he founded fort Lyman, now fort Edward, New York; at the battle of lake George took command of the colonial forces after sir William Johnson was wounded; was present at the capture of Crown Point and Montreal; and in 1762 was at the head of the colonial troops in the expedition against Havana. From 1763 to 1774 he was in England, endeavoring to get a grant of land along the Mississippi from the government. A tract in the vicinity of Natchez was granted to the company for which he was agent, in the latter year; and he took over a company of immigrants, but died soon after arriving in west Florida.

LYMAN, THEODORE, 1792–1849; b. Boston; graduated at Harvard in 1810; visited Europe in 1814, and published in the same year a small volume, *Three Weeks in Paris*. After studying law he made a second visit to Europe, returning from which he published in 1820 *The Political State of Italy*. In 1820 he was Boston's chosen orator for the Fourth of July. In 1823 he wrote an *Account of the Hartford Convention*, defending its proceedings and the motives of the men who called it. In 1826 he published *The Diplomacy of the United States with Foreign Nations*. He was an active politician, and served in both branches of the legislature. From 1832 to the close of 1835 he was mayor of Boston, and in August of the latter year presided at the great pro-slavery meeting in Faneuil hall, the proceedings of which so inflamed the disorderly spirit of the time that a mob of "gentlemen of property and standing," a few weeks later, broke up a meeting of anti-slavery women, and was with difficulty prevented from taking the life of William Lloyd Garrison. The mayor, instead of seeking to disperse the mob, ordered the ladies, who had peacefully assembled for anti-slavery discussion and prayer, to give up their meeting and retire to their homes; but when he found that Mr. Garrison was in

the hands of the mob and likely to be killed, he made an earnest and successful effort for his rescue, and committed him to jail to save his life.

LYMAN, THEODORE BENEDICT, D.D., b. Mass., 1815; educated at Hamilton college and the general theological (Prot. Epis.) seminary of New York, and ordained in the Episcopal church. He was rector of churches in Hagerstown, Md., Pittsburg, Penn., of the American churches at Rome and Florence, and of Trinity church, San Francisco. In 1873 he was elected assistant bishop of North Carolina.

LYME GRASS, *Elymus*, a genus of grasses, the species of which are natives of the temperate and colder regions of the northern hemisphere. The spikelets grow in pairs from the joints of the *rachis*, and each has 2 to 4 fertile florets, and two awnless glumes, both on the same side.—The SEA LYME GRASS (*E. arenarius*) is frequent on the sandy shores of Britain and other parts of Europe. It is a coarse, grayish grass, often three or four feet high, with spiny-pointed leaves and upright close spikes; a perennial with creeping roots, very useful in binding the sand. On this account, it is much sown on the shores of Holland, and also to some extent on those of Britain. In Iceland and other countries, it is used for thatch. The seed, which is large, is collected in Iceland, and ground into meal, which is made either into porridge or into soft thin cakes, and is esteemed a great delicacy.—A closely allied species or a variety, called GIANT LYME GRASS (*E. giganteus*), is often sown in Holland, being preferred for its more vigorous growth.—Various expedients are adopted to secure the growth of lyme grass seeds in very loose sands, as the laying down of pieces of turf, a gradual advancement from the margin of the sand, etc.

LYME RE'GIS, a seaport, municipal and parliamentary borough and watering-place of England, in Dorsetshire, is situated at the mouth of a rivulet called the Lym, 26 m. w. of Dorchester. It received its first charter in the middle of the 13th c., and was a port of considerable importance during the reign of Edward III., for whom it provided three ships to assist in the siege of Calais in 1346. Its pier, called the *Cobb*, is semicircular in form. It returns one member to parliament. In 1872, 79 vessels of 4,592 tons, in the foreign, colonial, and coasting trade, entered and cleared the port. Pop. '71, 2,333.

LY'MINGTON, a sea-port, market-town, and municipal and parliamentary borough of England, in the county of Hants, at the mouth of a river of the same name, and on a creek communicating with the Solent, 18 m. s.s.w. of Southampton. Salt has long been manufactured; some of the salt works being of great antiquity, and possibly of British origin. Lymington is also of some importance as a watering-place. It commands fine prospects of the isle of Wight and the English channel, and its vicinity abounds in charming scenery. Lymington returns two members to parliament. Pop. '71 of parliamentary borough, 5,356.

LYMPH (Gr. *lympha*, water) is the term applied by physiologists to the fluid contained in the lymphatics (q.v.). It is a colorless or faintly yellowish red fluid, of a rather saltish taste, and with an alkaline reaction. It coagulates shortly after its removal from the living body, and forms a jelly-like, semi-solid mass, which continues for some time to contract, so that at last the clot is very small, in proportion to the expressed serum. On microscopic examination, the lymph is seen to contain corpuscles which do not in any respect differ from the colorless blood-cells, molecular granules, fat globules, and occasionally blood corpuscles. The chemical constituents of lymph seem to be precisely the same as those of blood, excepting the substance peculiar to the red corpuscles.

From experiments on animals, it has been inferred that upwards of 28 lbs. of fluid (lymph and chyle) pass daily into the blood of an adult man.

The lymph seems to owe its origin to two distinct sources, viz., to the ultimate radicles of the lymphatic system, which contribute the homogeneous fluid portion, and the lymphatic glands, which contribute the corpuscles, granules, etc., seen under the microscope.

The uses of the fluid are twofold: in the first place, to convey from the tissues to the blood effete matters, to be afterwards excreted by the skin, lungs, and kidneys; and secondly, to supply new materials for the formation of blood.

LYMPHATICS, the vessels containing the lymph (q.v.), are also called *absorbents*, from the property which these vessels possess of absorbing foreign matters into the system, and carrying them into the circulation. The lymphatic system includes not only the lymphatic vessels and the glands through which they pass, but also the lacteals (q.v.), which are nothing more than the lymphatics of the small intestine, and only differ from other lymphatics in conveying chyle (q.v.) instead of lymph during the latter part of the digestive process.

The lymphatics are minute, delicate, and transparent vessels, of tolerable uniformity in size, and remarkable for their knotted appearance, which is due to the presence of numerous valves, for their frequent dichotomous divisions, and for their division into several branches before entering a gland. They collect the products of digestion and the products of worn-out tissues, and convey them into the venous circulation near the heart. They are found in nearly every texture and organ of the body, excepting the substance of the brain and spinal cord, the eyeball, cartilage, tendon, and certain fetal strictures, and possibly also the substance of bone.

The lymphatics are arranged in a superficial and a deep set. The superficial vessels on the surface of the body lie immediately beneath the skin, and join the deep lymphatics in certain points through perforations of the deep fascia; while in the interior of the body they lie in the sub-mucous and sub-serous areolar tissue. They arise in the form of a net-work, from which they pass to lymphatic glands or to a larger trunk. The deep lymphatics are larger than the superficial, and accompany the deep blood-vessels; their mode of origin is not known with certainty. The structure of the lymphatics is similar to that of veins and arteries.

The lymphatic or absorbent glands are small, solid, glandular bodies, varying from the size of a hemp-seed to that of an almond, and situated in the course of the lymphatic vessels. They are found in the neck (where they often become enlarged and inflamed, especially in scrofulous subjects), in the axilla, or arm-pit, in the groin (where, when inflamed, they give rise to the condition known as *bubo*), and in the ham; while deep ones are found abundantly in the abdomen and the chest.

The lymph of the left side of trunk, of both legs, of the left arm, and the whole of the chyle, is conveyed into the blood by the thoracic duct (q.v.); while the lymph of the right side of the head, neck, and trunk, and of the right arm, enters the circulation at the junction of the axillary and internal jugular veins on the right side, by a short trunk, guarded at its opening by valves.

LYNCH, Henry Blosse, 1798–1873; b. Ireland; entered the navy in 1823, and served in the east for most of the time till his retirement in 1854. He was familiar with Persian and Arabic, and in the early part of his career acted as interpreter, and carried on negotiations with native tribes. He was next in command to col. Chesney, in the Euphrates expedition of 1834, and subsequently held command in the Indian navy.

LYNCH, Patrick Nilson, D.D., b. Cheraw, S. C., 1817; studied theology in the Roman Catholic seminary at Charleston in 1834, and in the college of the propaganda at Rome; was ordained priest in 1840; returned to Charleston, and was appointed rector of the seminary and professor of theology. After serving as rector of St. Mary's parish and of the cathedral, he became vicar-general in 1850; was appointed by the pope in 1857 bishop of Charleston. During his administration he built the fine cathedral of St. Michael's and other churches, founded an Ursuline convent and an orphan asylum, and established many schools. Some of these having been destroyed in the war, he has traveled extensively in the north since 1865 collecting funds for their restoration. He has published some theological and scientific essays. In 1869 he was a member of the Vatican council, and sustained the dogma of papal infallibility.

LYNCH, Thomas, Jr., 1779–1849; b. S. C.; educated in England, where he studied law. Returning to South Carolina in 1772, he became identified with the resistance of the colonies to Great Britain; was elected to the continental congress in 1776, to fill a vacancy occasioned by the death of his father, and was one of the signers of the declaration of independence.

LYNCH, William F., 1801-65; b. Va.; an officer in the naval service of the United States. In 1848 he conducted a valuable official survey of the Jordan river and the Dead sea. He became commander in 1849, captain in 1856, and deserted to the confederacy in 1861, in which service he was given the rank of commodore.

LYNCH'BURG, a city of Virginia, on the James river, 120 m. w.s.w. of Richmond, remarkable for picturesque situation and scenery. It has 10 churches, a college, 40 tobacco factories, 2 iron foundries, etc. Pop. '70, 6,825.

LYNCH'BURG (*ante*), situated on the s. bank of the James river, and on the James river and Kanawha canal. It is 90 m. from Richmond, and is the point of junction of the Atlantic, Mississippi and Ohio, and Washington City, Virginia Midland and Great Southern railroads; pop. '80, 15,959. The situation of the city is picturesque and romantic in the extreme. Here a steep acclivity rises gradually from the banks of the river, breaking into numerous hills as it completes its elevation, whose terraced walks, ornamented with trees and skirting handsome dwellings, present a most pleasing appearance. In the background, at a distance of 20 m., but fully in view, rise the Blue Ridge and the Peaks of Otter, standing in bold relief against the sky. This city derives its chief importance from being the center of an enormous tobacco manufacture, and on account of its comprehensive railroad facilities. Vast fields of coal and iron-ore are in the immediate neighborhood, and not far are the celebrated Botetourt iron-works. Lynchburg dates back to 1786. It was used as a base of supplies by the confederates during the rebellion. Its public buildings are numerous and well built; it possesses a thorough public school system, with graded and high schools; and has 13 churches and chapels.

LYNCH LAW, the name given in the United States of America to the trial and punishment of offenders in popular assemblies without reference to the ordinary laws and institutions of the country. This barbarous mode of administering justice has always more or less prevailed in every country in times of great popular excitement, and has been necessarily resorted to in countries newly settled, where the power of the civil government is not yet sufficiently established. The name is derived by Webster from a Vir-

ginian farmer; but a more interesting explanation is found in the story of James Lynch, mayor of Galway about 1495, who, in the spirit of Brutus, with his own hands hanged his son from a window for murder.

LYNCH LAW (*ante*) is said to have derived its name from one James Lynch, a farmer in Piedmont co., Va. As there was no regularly established court of law in the vicinity, the inhabitants were in the habit of bringing disputed questions, or the trial of criminals, before Lynch, who gave summary judgment according to his opinion of the facts, without any too strict adherence to the letter of the law. From the frequency with which he performed the duties of a judge, he came to be known as "judge" Lynch, and his name was given to the custom of violent, unauthorized trial and execution which has sprung up in the new and turbulent communities of the west and south in this country. It has gradually disappeared from most of those communities as their population has increased, and now lingers in only the least advanced of them. In a new country, in which justice cannot be administered, it seems sometimes a necessary evil. Though the name is commonly considered to have had its origin as described, its real origin is entirely problematical. It is also ascribed to other persons of the name of Lynch; one, the founder of the town of Lynchburg, Va.; the other, a person sent to this country from England, in the 17th c., under a commission to suppress piracy, and who is credited with having faithfully carried out his instructions to execute, without the formality of a trial, any pirate whom he could capture. According to another account, lynch law owes its name to James Fitzstephens Lynch, who was mayor of Galway in 1493. He carried on an extensive trade with Spain, where he sent his son, with a large sum of money, to buy wine. Young Lynch spent the money, but bought a cargo on credit from a Spanish merchant, whose nephew came to Ireland on the ship with young Lynch to collect the money. Lynch, to cover his own crime, threw him overboard. The murder was revealed by a sailor to the mayor of Galway, who tried and condemned his son; and when his family attempted to prevent the sentence from being carried into effect, himself acted as his son's executioner. Lynch law was anciently known in England by the name of Lydford law. Lydford, in Devonshire, was a walled town, with a castle, wherein the courts of the duchy of Cornwall were held. Persons accused of violating the laws of the duchy were imprisoned in so foul a jail, before being brought to trial, that Lydford law became a proverbial expression for summary punishment without trial. The same thing was variously called, in Scotland, Cowper law, Jedburgh justice, etc.

LYNDHURST, Lord (JOHN SINGLETON COPLEY), English lawyer and statesman, was the son of J. S. Copley, R.A., painter of the "Death of Chatham," and other esteemed works. The Copleys were an Irish family, the painter's grandfather having emigrated from the co. of Limerick, and settled at Boston, United States, where Lyndhurst was b. May 21, 1772. While he was yet an infant, his father removed to England for the practice of his art. Lyndhurst was educated at Trinity college, Cambridge, where he was second wrangler and Smith's prizeman in 1794, and a fellow in 1797. Called to the bar at Lincoln's Inn in 1804, he chose the midland circuit, and soon obtained briefs. In politics he was at first a liberal, and long expressed sentiments hostile to the ministry of the day. He ably defended Watson and Thistlewood on their trial for high treason in 1817, and obtained their acquittal. Some surprise was therefore expressed when, in 1818, he entered parliament for a government borough. In 1819 he became solicitor-general in the Liverpool administration, and in 1823 was promoted to the rank of attorney-general. It was much to his credit that, unlike his predecessors, he instituted no *ex-officio* informations against the press. In 1826 he became master of the rolls. When Mr. Canning was charged to form a ministry in 1827, he offered the great seal to Lyndhurst (then sir John Copley), who was raised to the upper house, and remained lord chancellor from 1827 to 1830. In 1831 he became lord chief baron of the exchequer, which office he exchanged for the woolsack during the brief administration of sir R. Peel in 1834. In 1835 he led the opposition to the Melbourne ministry in the upper house, in speeches of great power and brilliancy. Lyndhurst's orations and annual reviews of the session did much to reanimate the conservative party, and pave the way for their return to power in 1841. He then became lord chancellor for the third time, and held the great seal until the defeat of the Peel government in 1846. After that time he took little part in home politics; but his voice has often been heard on matters of foreign policy, and in denunciation of tyranny in Italy and elsewhere. He died in London, Oct. 12, 1863. Lyndhurst's high attainments as a lawyer have never been questioned, and his judgments—of which that in the great case of Small *v.* Attwood may be particularly cited—have never been excelled for clearness, method, and legal acumen. In the house of peers he had few equals among his contemporaries. So near his end as 1860, when he was 88 years of age, he maintained, with great force and ability, the right of their lordships to reject the paper-duties bill—an act which the lower house resented as a breach of its privileges.

LYNDON, a t. in Caledonia co., Vt., on the Connecticut and Passumpsic railroad, 40 m. e. of Montpelier, and about the same distance s. from the Canada line; pop. 2,179; has 5 churches, a college under Baptist control, a large and flourishing academy and graded

school, a national bank, a weekly newspaper, the offices and repair-shops of the Connecticut and Passumpsic railroad, several carriage factories, mills, stores, shops, etc.

LYNN, a city of Massachusetts, 9 m. n.e. of Boston, in which nearly the whole population is engaged in the manufacture of boots and shoes, leather, lasts, and works connected with this manufacture, which employs about 10,000 hands. Much of this manufacture has been for the southern states. The value of the boots, etc., annually shipped is 13 to 14 million dollars. Lynn has 30 churches, 58 public day-schools, 5 banks, 4 newspapers. Pop. '70, 28,233.

LYNN (*ante*), a city in Massachusetts, settled 1629, incorporated 1850; extending for 3 m. along the Atlantic shore, having a small harbor lying w. of the peninsula of Nahant, in the n. portion of Massachusetts bay; about 10 sq.m.; pop. '80, 38,284. It is directly connected with Boston by the Boston, Revere Beach and Lynn narrow-gauge railroad, and by a horse railroad. The Eastern railroad passes through it, connecting it with Salem, 5 m. away. It is the terminus of the Saugus to Everett branch of the Eastern railroad, and is 2 m. from the watering-place of Nahant. It contains a free public library of about 19,000 vols., and 3 handsome and commodious halls, besides a fine brownstone city hall, costing $311,722. The capital of its 3 national banks, collectively, is $1,000,000. It has 2 fire insurance companies. Many fine brick buildings for the purposes of manufacture and trade have been erected, but the residences are mostly of wood. A large number of beautiful villas are occupied by residents of the neighboring cities, who find the beach a great attraction. The n. section is thinly settled, and thick forests appear in the suburbs. Its shipments to the s. and w. of boots, shoes, and brogans, as estimated for one year, amounted to 10,000,000 pairs, worth $18,000,000. The beginning of its prosperity was in 1750. The present capital employed is estimated at $1,000,000, occupying 200 establishments, and using the McKay sole-sewing machine. The leather interest employs $500,000 capital, some of the factories tanning and finishing 5,000 skins a week. The Saugus river flows along the w. boundary, emptying into the harbor, and its e. boundary is formed by a succession of lakes or ponds called Flax, Cedar, etc. In the center of the city is a hill called High Rock, 185 ft. in height, belonging to a range of hills that forms its n. background. The rest of the city is built on flats but a few feet from the water level. It has a beautiful common and a number of little public parks, and 2 cemeteries, called Pine Grove and St. Mary's, laid out in a picturesque manner, and ornamented with rare flowers, which are tended with care. Two ponds, Breed's and Birch, supply the waterworks, built at a cost of $800,000, requiring 2,000,000 galls. per day. The apparatus used is of the best for the purpose, and the reservoir-pressure is 177 ft. It has a soldiers' monument of bronze and granite, costing $30,000, dedicated in 1873. It has a considerable coasting trade, and is engaged in fishing. Its city government is composed of a mayor, board of aldermen with 8 members, and a common council of 22. It has a well-organized fire department, with an electric alarm, and its school buildings are on the best modern plan as to ventilation, modes of egress, etc. It has 8 evening schools. It holds the remains of the original iron-works of America in the shape of an ancient forge, and it is the place where the first fire-engine was made. It originally comprised the town of Swampscot, organized in 1852, and Nahant, organized in 1853. In 1861, at the call of the state for troops, it returned the significant response, "We have more men than guns; what shall we do?"

LYNN, LYNN REGIS, or KING'S LYNN, a seaport, municipal, and parliamentary borough of England, in the county of Norfolk, is situated about 3 m. from the mouth of the Great Ouse, and 41 m. w.n.w. from Norwich. It was formerly fortified, and the old moat still forms the eastern boundary of the town, and portions of the walls remain. The grammar school, with an annual income from endowment of £75, has six exhibitions for Cambridge. Ropes are manufactured here, and ship-building is carried on. Great numbers of shrimps are caught, and sent to London. The imports are corn, oil-seed cake, cork, sulphur, wine, coal, and timber. In 1872, 914 vessels in the foreign, colonial, and coasting trades, of 92,961 tons, entered and cleared the port. It returns 2 members to parliament. Pop. '71, 17,266.

LYNX, a genus of *felidæ*, having a less elongated form than many others of that family, the body elevated at the haunches, long fur, a short tail, and the ears tipped with tufts or pencils of hairs. They are less courageous than other felidæ of similar size, and prey on small quadrupeds and birds. In pursuit of birds, they climb trees. They are generally of a sullen and suspicious temper, and not easily tamed. To this genus belongs the caracal (q.v.), which is probably the lynx of the ancients. The species are pretty numerous, and widely distributed, but the distinctions of species and varieties are somewhat uncertain. The EUROPEAN LYNX (*L. virgatus*) is common in many parts of Europe and Asia, chiefly in mountainous and wooded districts. Its color is variable, but generally of a dark reddish gray, spotted with reddish brown, the belly whitish. It is about 3 ft. long. It is proverbial for acuteness of sight. It is hunted in winter for its fur, which is always in demand in the market; but many of the lynx skins imported from the n. of Asia probably belong to other species: those of North America, and probably also many of those of the n. of Europe and of Asia, are the skins of the CANADA LYNX (*L. Canadensis* or *L. borealis*), which is generally of a hoary-gray color, a broad space along the back blackish brown. It is rather larger than the European lynx, and

more clumsy in form.—The BAY LYNX (*L. rufus*) is found in more southern parts of North America, both in mountainous and swampy districts, and often makes great havoc among poultry. It is commonly called in America the wildcat.

LYON, a co. in n.w. Iowa, having the state line of Minnesota for its n.e. boundary, the territorial line of Dakotah for its n.w., the Sioux river, an affluent of the Missouri, for its w. border, forming a part of the Dakotah line; 650 sq.m.; pop. '80, 1968—1551 of American birth. It is drained by Rock river, sometimes called Inyan Reakah (river of the rock), and the East fork. Its surface is formed of undulating prairies nearly destitute of timber; extensive willow hedges have been planted in certain sections. Sioux quartzite is found in the w. portion. Its soil is fertile and well adapted to stock-raising, and the production of oats, corn, wheat, and potatoes. Its inhabitants are principally engaged in agriculture. Seat of justice, Rock Rapids.

LYON, a co. in e. Kansas, intersected by the Missouri, Kansas and Texas railroad, and the Atchison, Topeka and Santa Fe railroad, forming a junction at Emporia; 850 sq.m.; pop. '80, 17,327—15,416 of American birth, 1029 colored. It is drained by the Neosho river, Osage river in the extreme n.e., and Cottonwood creek. Its surface is undulating, and adapted to stock-raising and the production of every variety of grain, tobacco, wool, sweet potatoes, dairy products, and sorghum. It produced in '70, 2,252 lbs. of honey. Along the water-courses are small groves of oak, hickory, cottonwood, and walnut, but the larger proportion is open prairie land with under-strata of limestone, beds of bituminous coal, and every element of fertility. Cash value of farms in '70, $2,551,968, numbering 792. It had in '70, 11 manufacturing establishments, consisting of flouring-mills, saw-mills, brick kilns, foundries, broom factories, furniture, soap and cheese factories, and woolen mills. Seat of justice, Emporia.

LYON, a co. in w. Kentucky, having for its s.w. boundary the navigable Tennessee river, and for its n.w. the river Cumberland, which also is an important commercial channel flowing through it centrally, and through one of its affluents forming the n. border; 320 sq.m.; pop. 80, 6,768—6,723 of American birth, 1488 colored. It is intersected by the Paducah and Elizabethtown railroad. Its surface is generally level and well timbered; containing rich beds of coal and iron ore. Its soil, fertile along the water-courses, is adapted to the raising of stock, for which this region is famous. It has good pastures throughout the year, and produces oats, corn, rye, wheat, and the products of the dairy, tobacco, wool, sweet potatoes, wine, and sorghum. It produced in '70, 4,493 lbs. of honey. It has manufactories of hubs and spokes, rolling mills in which boiler iron is manufactured, lime kilns, etc. It had in '70, 11 manufactories, employing 217 hands, with a capital of $413,000, and an annual product of $560,360. Seat of justice, Eddyville.

LYON, a co. in s.w. Minnesota, having the Yellow Medicine river, a branch of the Minnesota, in the extreme n., near the boundary line; also the head waters of two other branches, the Redwood and Big Cottonwood; 720 sq.m.; pop. '80, 6,257—4,558 of American birth, 2 colored. Its surface is rolling, and spreads out into fertile prairies, diversified by numerous small lakes. It is intersected centrally by the Winona and St. Peter railroad, crossing all the rivers. It has manufactories of brick and lumber. Seat of justice, Marshall.

LYON, a co. in w. Nevada, intersected centrally by the Carson river, is bounded on the n.w. by the Washoe mountain range, and drained by a lake in the s. portion; 480 sq.m.; pop. '80, 2,409—1191 of American birth, 396 colored. Its surface is mountainous, with very few trees. It contains a part of Carson valley and Walker river valley, having a very fertile soil and affording good pasturage. It produces oats, corn, and potatoes, and yields immense quantities of silver. Its leading industries are lumber-sawing and the milling and smelting of ores. Gold, borax, salt, and copper are abundant. Its manufacturing establishments are mostly iron foundries and machine shops, of which in '70 it had 24, employing 387 hands, with a capital of $537,500, and an annual product of $1,830,165. Seat of justice, Dayton.

LYON, CALEB, LL.D., 1822–75; b. at Lyonsdale, N. Y., a place founded by his father; graduated at Norwich (Vt.) university in 1841; traveled in Europe; was appointed by president Polk consul at Shanghai, China. After returning home he visited Mexico, Brazil, Chili, Peru, and other countries; was in California in 1849, serving as secretary of the constitutional convention, and designing the coat-of-arms of that state; made a second visit to Europe, going also to Egypt and Palestine; identified himself with the "Koszta affair" at Smyrna; was elected to the New York assembly and afterwards to the senate; was a member of congress in 1853–55; and governor of Idaho territory in 1864–66.

LYON, GEORGE FRANCIS, 1795–1832; b. Chichester, Eng.; entered the navy at the age of 13; joined the squadron of lord Exmouth for the attack on Algiers in 1816; accompanied the traveler, Joseph Ritchie, in his expedition to n. Africa in 1818. After many privations and perils in exploring Soudan, the course of the Niger, etc., he returned to England in 1820, and published his *Narrative of Travels in Northern Africa*. In 1821, in command of the *Hecla*, he accompanied capt. Parry in his voyage of discovery to Hudson's bay. Returning in 1823 he published in London an account of the

expedition. In 1824 he made an unsuccessful voyage with the *Griper* to Repulse bay in the Arctic regions, of which he gave an account in 1825. In 1826 he traveled in Mexico, spending some time in surveying its mines. Besides the works mentioned he published, *The Sketch Book of Capt. F. G. Lyon during Eighteen Months' Residence in Mexico, No.* 1, and *Journal of a Residence and Tour in the Republic of Mexico in* 1828.

LYON, MARY, 1797–1849; b. Mass.; in early life conscientious and noted for the ease with which she comprehended and memorized her lessons. At the age of 20, besides keeping up with her classes in their regular lessons, she daily committed and accurately recited so much of Adams's Latin grammar as it was usual for scholars to learn within three days. From 20 to 26 years of age we find her, now teaching to add to her scanty patrimony, now expending all she possessed in some one line of effort for mental improvement. In 1822 she united with the Congregational church in Buckland, Mass. Her schools in Ashfield and Buckland were noted for their religious influence and superior mental training. In 1824 she joined Miss Grant as assistant principal in her school in Derry, N. H. To her she ascribes the suggestion of some of those principles and methods which were so wisely and successfully tested in their schools in Derry and Ipswich, and also at South Hadley, and which were adopted later in Rugby, Eng., and in other institutions. They aimed to induce the pupils to govern themselves instead of being constrained by penalties, to act as under the eye of the heavenly Father, to aspire for the happiness which springs from doing good to others, even at a temporary sacrifice. For these ends the Bible was made one of the regular text-books of the school. In 1830 Miss Lyon became interested in the idea, then new in this country, at least among Protestants, of a *permanent* seminary for girls "with buildings, library, and apparatus, owned as colleges are, where successive generations of young ladies might be trained." She made great effort to secure this, but the object was not appreciated. She changed her plan. She now proposed to found an institution which should offer a thorough education on such terms as would be available for young women of moderate means. To preserve habits of home industry, to inspire a spirit of true independence and wise economy, it was her plan that the domestic tasks of the household should be so divided and arranged that each could perform a daily share without taking more time from study than was necessary to give healthful exercise. No sooner was this design announced than general attention to it was aroused. Many opposed; many also approved. Miss Lyon's patient and diligent elucidation of her design overcame objection. The money needed was given with enthusiasm. South Hadley, near Mt. Holyoke, was chosen as the site of the seminary. In 1837, buildings and necessary accommodations for 80 pupils being nearly completed, the school opened with more than that number. It was afterwards enlarged to receive 300 pupils. The remaining twelve years of Miss Lyon's life were devoted to this school. More than 60 of her pupils have engaged in missionary work among the women of heathen lands, and hundreds more have reflected Miss Lyon's example and influence, which they found in the schools. In all her schools together she taught 3,000 pupils. She wrote *Tendencies of the Principles Embraced and the System Adopted in the Mount Holyoke Female Seminary;* also, *The Missionary Offering. The Power of Christian Benevolence Illustrated in the Life and Labors of Mary Lyon* was compiled by Edward Hitchcock, D.D., LL.D., and published in 1851. An abridgment of this work was issued by the American tract society in 1858. Mary Lyon was the pioneer of the highest culture of American womanhood. Not beautiful in appearance, there was little that told of the energy, persistence, sagacity, and withal great tenderness and constant cheerfulness, combined with rare administrative talent, that sustained and carried through her great work. She planted the seed of which Vassar, Wellesley, Smith, and sister colleges are the fruits.

LYON, MATTHEW, 1746–1822; b. Wicklow co., Ireland; emigrated to New York in 1755; unable to pay for his passage he was committed by the captain, according to the custom of the time, to a farmer in Connecticut, with whom he served several years; subsequently removed to Vermont; became, 1775, lieut. in a company of "Green Mountain Boys;" was cashiered the latter part of the year for deserting his post; was in 1777 temporary paymaster of the northern army; subsequently commissary-general and col. of militia; founded the town of Fairfield, Vt., in 1783; built saw-mills and grist-mills, established a forge, made paper from basswood, established and edited a paper called *The Scourge of Aristocracy and Repository of Important Political Truth,* the types and paper of which were made by himself. He was ten years a member of the legislature, and in 1786 judge of Rutland co. court; became a zealous politician, and was elected to congress by the anti-federal party, 1797–1801; was convicted in 1798 of libel on president Adams, imprisoned four months in the Vergennes jail and fined $1000, which was paid by his friends. An attempt to expel him from congress as a convicted felon failed. While in congress he had a violent personal encounter with Roswell Griswold of Connecticut. After the expiration of his term as representative he removed in 1801 to Kentucky; was elected to the legislature, and to congress in 1803–11; built gunboats on speculation for the war of 1812, and became bankrupt; was appointed by president Monroe in 1820 U.S. factor for the Cherokee Indians in Arkansas, and elected territorial delegate to congress a short time before his death.

LYON, NATHANIEL, 1819–61; b. Conn.; a student at West Point, graduated in 1841. He continued in the army, and was employed in active service during the Mexican and Florida wars, and afterwards served in Kansas and on the frontier. Being in command of the U.S. arsenal at St. Louis in 1861, at the outbreak of the rebellion, he dispersed the secessionists collected by the governor, Jackson, and soon after attacked and defeated a rebel force at Boonesville, June 17, 1861. He was now made a brig.gen., and on Aug. 2 won another victory over a detachment of confederate troops at Dry Spring, near Springfield, Mo., and a week later fought the battle of Wilson's Creek, where he was shot and instantly killed. He won the first successes of the war, and his loss was greatly deplored by the army and by the northern people. He still further signalized his patriotism by bequeathing nearly his entire possessions, about $30,000, to the government, to be employed in forwarding the objects of the war. A collection of articles written for a Kansas newspaper in 1860 was published after his death under the title, *The Last Political Writings of Gen. Nathaniel Lyon.*

LYON COURT, one of the inferior courts of Scotland, having jurisdiction in questions regarding coat-armor and precedency, and also in certain matters connected with the executive part of the law. It is presided over by the Lyon king-of-arms (q.v.) or lord Lyon. Attached to the Lyon court are a certain number of heralds (q.v.) and pursuivants (q.v.) appointed by him, whose principal duty is now the execution of royal proclamations in Edinburgh, though the heralds were, in old times, to some extent associated with Lyon in the exercise of his jurisdiction. Lyon appoints the messengers-at-arms (officers who execute the process of the court of session), superintends them in the execution of their duty; and in the exercise of his judicial function, takes cognizance of complaints against them, and fines, suspends, or deprives them for malversation. It was formerly the practice for Lyon to appoint a deputy, who assisted him more or less in his judicial duties; but act 30 Vict. c. 17 has made it incompetent for him to do so in future. Among the officials of his court are the Lyon-clerk and keeper of records, formerly appointed by him, but in future to be appointed by the crown; the procurator-fiscal, or public prosecutor; a herald painter; and a messenger-at-arms, who acts as macer. The jurisdiction of the Lyon court is defined by two acts of the Scottish parliament, 1592, c. 127, and 1672, c. 21, and further regulated by 30 Vict. c. 17. The Scotch acts authorize the lord Lyon to inspect the ensigns armorial of all noblemen and gentlemen in Scotland, and oblige all persons who, by royal concession or otherwise, had previously a right to arms, to matriculate or register them in the Lyon's books. He is empowered to inquire into the relationship of younger branches of families having right to arms, and to "assign suitable differences to them, without which the arms cannot lawfully be borne." The later act establishes the now existing register of the Lyon court as the "true and unrepealable rule of all arms and bearings in Scotland," and authorizes the lord Lyon to "give arms to virtuous and well-deserving persons," not hitherto entitled to bear them. The unlawful bearing of arms subjects the delinquent to a fine, and confiscation of all the movable goods and gear on which the said arms are engraven or otherwise represented. Both acts are in full force: the differencing of cadets and granting of new coats are matters of daily practice in the Lyon office. On cause shown, Lyon also empowers applicants to alter or add to the coat to which they are already entitled, and sanctions the adoption of quarterings to indicate representation. He grants arms in conformity to stipulations in entails or other deeds of settlement, imposing on the heirs succeeding the condition of assuming a certain name and arms. When a change of surname is connected with a change of arms, it is the practice to grant an official recognition of the new surname along with the patent of arms, the certificate of which recognition serves the same purpose in the case of a Scotchman as the royal license does in the case of an Englishman, and is required by the war office and admiralty from officers in the army and navy. In his judicial capacity, Lyon investigates and decides in claims to particular coats of arms or armorial distinctions, his decision being subject to review in the court of session.

Right to bear arms is acquired either by descent or by grant. 1. In the former case, only the representative or head of the family can use the undifferenced coat; but a cadet, on presenting a petition to the lord Lyon, and establishing his relationship, has, by a matriculation, the family coat assigned to him, with such a difference as, according to the rules of heraldry, appropriately sets forth his relationship to the head of the family and to other cadets already matriculated. The mere fact of one's bearing the same surname with a family entitled to arms, confers no sort of right to wear these arms, differenced or undifferenced. 2. Where no hereditary right exists or can be proved, an original grant of arms may be bestowed by the lord Lyon. As in the case of a matriculation, a petition is presented to the Lyon court, which, in this case, need be accompanied with no evidence of pedigree; and in granting new coats, it is the duty of the Lyon to conform to the rules of good heraldry, and be observant of the rights of other parties. With these reservations, the wishes of the applicant are consulted as to the arms which he is to bear. The fees are now regulated by 30 Vict. c. 17, and amount to about £14 for a matriculation, where relationship is proved, and for an original grant, £42. An additional charge is made for supporters (q.v.), which are only given to those persons who are entitled to them by the heraldic practice of Scotland.

In strictness, the using of a crest on one's plate or seal without authority, is a transgression of the above-mentioned acts; but practically, prosecutions have generally been confined to cases of open and public assumption of a shield of arms. The offender is cited before the Lyon court by precept at the instance of the procurator-fiscal; the statutory fine and confiscation have occasionally been enforced, but they have oftener, particularly of late, been avoided by a timely submission. In this commercial country, there are not a few persons whose social status would entitle them to the use of arms, but who, not having inherited a coat, instead of acquiring the privilege in a legal way, have a sham coat invented for them by some coach-painter or "finder" of arms.

The register of genealogies is a department of the Lyon office unconnected with heraldry, where evidence is taken of the pedigree of applicants, irrespectively of noble or humble lineage, and recorded for preservation.

LYON KING-OF-ARMS, or LORD LYON, the title borne since the first half of the 15th c. by the chief heraldic officer for Scotland. He is the presiding judge in the Lyon court (q.v.), and appoints the heralds, pursuivants, and messengers-at-arms. Unlike the English kings-of-arms, he has always exercised jurisdiction independently of the constable and marshal, holding office directly from the sovereign by commission under the great seal. In Scotland he takes precedence "of all knights and gentlemen not being officers of state, or senators of the college of justice." In England he ranks after garter, and before the provincial kings-of-arms. Since the revival of the order of the thistle, he has been king-of-arms of that order. So sacred has his person been held that, in 1515, lord Drummond was declared guilty of treason, attainted, and imprisoned in Blackness castle, for striking Lyon. Prior to the revolution, Lyon was solemnly crowned at Holyrood on entering on office by the sovereign or his commissioner, his crown being of the form of the royal crown of Scotland, but enameled instead of being set with jewels. The crown is now only worn at coronations; and that actually supplied on occasion of the last four appointments has been similar to the crowns of the English king-of-arms. Lyon's badge or medal, suspended by a triple row of gold chains, or on common occasions by a broad green ribbon, exhibits the arms of Scotland, and on the reverse, St. Andrew on his cross; and his baton is of gold enameled green, powdered with the badges of the kingdom, and with gold ferrules at each end. Besides the velvet tabard of a king-of-arms, he has an embroidered crimson velvet robe; and as king-of-arms of the thistle, a blue satin mantle, lined with white, with a St. Andrew's cross on the left shoulder.

LYONNAIS, a former province of France, was bounded on the w. by Auvergne, and on the s. by Languedoc. Its territory coincides nearly with the present departments of Rhone, Loire, Haute-Loire, and Puy-de-Dôme.

LYONS, the second t. of France in respect of population, and the first with regard to manufactures, is the capital of the department of the Rhone, and stands at the confluence of the river of that name with the Saône, 316 m. by railway s.s.e. of Paris, 218 n.n.w. of Marseilles, and 100 w.s.w. of Geneva. It is situated partly on a low-lying peninsula between the two rivers, and partly on hills surrounding them, in a beautiful district covered with gardens, vineyards, and villas. It is the seat of an archbishop, and is the *chef-lieu* of the seventh military division. Many of the public buildings are interesting at once for their architecture, extent, and antiquity. Of these, the cathedral and church of St. Nizier, the hôtel-de-ville (town-hall), the finest edifice of the kind in the empire, the hospital, the public library with 150,000 volumes, and the palais des beaux arts, are perhaps the most notable among numerous and important institutions. There are also a university academy, an imperial veterinary school—the first founded in the country, and still the best—schools for agriculture, medicine, and the fine arts, etc. The printing trade is extensive in Lyons, and it has long been known for the vigor of its journals, such as the *Courrier de Lyon*. The two rivers are crossed by 19 bridges; 12 over the Saône, and 7 over the Rhone. The quays, 28 in number, are said to be the most remarkable in Europe. The principal are St. Clair, St. Antoine, and Orleans. There are several large and important suburbs—La Guillotière, Les Brotteaux, La Croix-Rousse, etc.; several fine squares, of which the *place Bellecour* is one of the largest in Europe. The fortifications extend in a circle of 13 m. round the city. From its situation on two great rivers, and on the Paris and Marseilles and other railways, Lyons has become the great warehouse of the s. of France and of Switzerland. The principa manufactures of Lyons are silk stuffs of all kinds, which have long been held in the highest esteem. An immense number of establishments, working 70,000 looms, giving employment directly or indirectly to 140,000 hands, are engaged in silk manufactures. Nets, cotton goods, blankets, hats, gold and silver lace, chemical products, drugs, liquors, earthenware, are also important articles of manufacture. The trade of Lyons is chiefly in its own manufactures and in the products of the vicinity; the arms and silk ribbons of St. Etienne, and the wines of Côte-Rôtie, Hermitage, and St. Peray. Pop. '76, 322,612.

LYONS, the ancient *Lugdunum*, was founded in the year 43 B.C. by Munatius Plancus. Under Augustus it became the capital of the province *Gallia Lugdunensis*, possessed a senate, a college of magistrates, and an atheneum, and became the center of the four

great roads that traversed Gaul. In 58 A.D., it was destroyed in one night by fire; but was built up again by Nero, and embellished by Trajan. In the 5th c., it was one of the principal towns of the kingdom of Burgundy; and in the 11th and 12th centuries, it had risen to great prosperity. To escape the domination of the lords and archbishops, the inhabitants placed themselves under the protection of Philippe-le-bel, who united the town to France in 1307. After the revolution (1789), Lyons, which had at first supported the movement with great enthusiasm, eventually became terrified at the acts of the central power, and withdrew from the revolutionary party. The result of this was, that the convention sent against Lyons an army of 60,000 men, and after a disastrous siege, the city was taken, and almost totally destroyed. It rose again, however, under the first Napoleon; and though, since then, it has frequently suffered much from inundations (1840 and 1856), and from the riots of operatives (1831 and 1834), it is now in a high state of prosperity.

LYONS, a city of Iowa, in the co. of Clinton, on the Mississippi river and the Midland and Dubuque railroad, and only 2 m. distant from the Northwestern, the Western Union, and a branch of the Chicago, Burlington and Quincy railroads; pop. 4,088. It is connected by a steam ferry with Fulton, Ill., and is traversed by a horse railroad. It has a paper-mill, saw-mills, sash factories, flouring-mills, machine-shops, carriage-shops, etc.; also 2 newspapers, 8 churches, a library, a seminary, and graded public schools. It is surrounded by a fine farming country.

LYONS, a t. in Wayne co., N. Y., on the N. Y. Central railroad and the Erie canal, nearly midway between Syracuse and Rochester; pop. '70, 5,115. The manufacture of oil of peppermint is an important industry, there being 20 peppermint distilleries, producing annually 100,000 lbs. of the oil. There are other manufactures; tobacco, grain, cider, and apples are among the productions.

LYONS, Edmund, Lord Lyons, 1790–1858; b. at Burton, Hampshire, England; a descendant of governor John Winthrop of Massachusetts; entered the British navy in childhood, and became a midshipman in 1803; served in the East Indies, becoming a commander in 1812, and a post-captain in 1814. In 1828 he was engaged in the blockade service at Navarino, Greece, then held by the Turks, and conveyed king Otho to Athens when the new kingdom was established; was knighted, and remained there as minister 14 years. In 1849 he became minister at Bern, and in 1851 at Stockholm. At the outbreak of the Crimean war he was appointed second in command of the Black sea squadron and commander-in-chief in 1854, and so distinguished himself by brilliant service that he was made a peer in 1856 under the title of baron Lyons of Christ church. Died at Arundel castle, Sussex.

LYONS, Richard Bickerton Pemell, D.C.L., Lord Lyons, b. England, 1817; educated at Winchester and Oxford, and entered the diplomatic service in 1839 as unpaid attaché at Athens. He was transferred to Dresden in 1852; to Florence, where he acted as secretary of legation, in 1853; and was made envoy to Tuscany in 1858. The same year he was sent as envoy extraordinary to the United States, and on his recall, at his own request, in 1865, he was made ambassador to Turkey, and in 1867 transferred to Paris, where he remains. In his successive important appointments he has proved himself an accomplished and skillful diplomatist.

LYONS, GULF of, in the Mediterranean, extending from the n.e. coast of Spain, on the w., to Toulon on the e., and receiving the Rhone, Hérault, Aude, and other rivers. It is subject to furious storms, and is said to have received its name, after the lion, on account of this circumstance. A portion of Catalonia, in Spain, and the departments in France of Pyrénées-Orientales, Aude, Hérault, Gard, Bouches-du-Rhone, and Var, lie on the coast of this gulf.

LYRA, Nicholas de, 1270–1340; b. Lyre, Normandy, France; studied in the Franciscan college at Verneuil, and at the university of Paris; became a doctor of divinity and eminent as a lecturer upon biblical interpretation. His thorough acquaintance with Hebrew led to the erroneous supposition that he was a Jew. He belonged to the Franciscan order, in which he held the most eminent positions, and his commentaries upon the Scriptures were in high repute among the reformers. His chief work, *Postillæ Perpetuæ in Universa Biblia*, in 5 vols. folio, is the only exegetical work of any value produced in the middle ages anterior to the revival of letters. The schoolmen of that day seldom understood Greek, never Hebrew, and therefore were poorly equipped as biblical commentators. He also wrote a work *On the Coming of the Messiah*, in reply to Jewish critics. Died in Paris.

LYRE, the oldest stringed instrument of the Egyptians and Greeks. There are many different kinds and sizes of the lyre, each having its own peculiar name, such as the lyre da Braccio, lyre da Gambe, lyre guitare, etc.

LYRE-BIRD, or Lyre-tail, *Menura*, a genus of birds, of which the best-known species (*M. superba*) is a native of New South Wales, where it is generally called the Lyre Pheasant. The proper place of this genus has been much disputed by ornithologists, some placing it among the *insessores*, near to thrushes and wrens, others among gallinaceous birds, with megapodes. The large feet and habit of scraping ally the lyre-bird with the latter; the form of the bill, the bristles at the base of the bill, and above all, its

musical powers, connect it with the former, to which it was unhesitatingly referred by Cuvier. It is a bird about the size of a pheasant, frequenting the *brush*, or sparsely-wooded country, in the unsettled parts of New South Wales, but retreating from the more inhabited districts. It is extremely shy and difficult to approach. It is by far the largest of all song-birds. It possesses the power of imitating the song of other birds. The tail of the male is very remarkable and splendid, the twelve feathers being very long, and having very fine and widely separated barbs; whilst, besides these, there are two long middle feathers, each of which has a vane only on one side, and two exterior feathers, curved like the sides of an ancient lyre. The lyre-bird makes a domed nest.—A second species (*M. Alberti*), also Australian, has recently been discovered, and has been named in honor of the late prince Albert. The lyre-shaped feathers of the tail are comparatively short.

LYRIC (from the Gr. *lyra*, a lyre), the name given to a certain species of poetry, because it was originally accompanied by the music of that instrument. Lyric poetry (see EPIC POETRY) concerns itself with the thoughts and emotions of the composer's own mind, and outward things are regarded chiefly as they affect him in any way. Hence it is characterized as *subjective*, in contradistinction to epic poetry, which is *objective*. Purely lyrical pieces are, from their nature, shorter than epics. They fall into several divisions, the most typical of which is the *song*, which is again subdivided into *sacred* (hymns) and *secular* (love-songs, war-songs, comic songs, etc.).

LYS, or LEYE, a tributary of the Scheldt, rises in France near the little town of Lysbourg, in the department of Pas-de-Calais, and flows in a n.e. direction, joining the Scheldt at Ghent in Belgium after a course of 100 miles. The Lys once formed the boundary between France and Germany.

LYSANDER, a famous Spartan warrior and naval commander, of extraordinary energy and military skill, but not less remarkable for the cunning, revenge, and ambition by which he was characterized. He spent part of his youth at the court of Cyrus the younger, and in 407 B.C. was appointed to the command of the Spartan fleet, from which time he constantly prosecuted the design of overthrowing the Athenian power, in order to exalt that of Sparta. He defeated the Athenian fleet at the promontory of Notion; and being again intrusted with the management of the fleet, after the defeat of his successor, Callicratidas (405 B.C.), he was again victorious. He swept the southern part of the Ægean, and made descents upon both the Grecian and the Asiatic coasts. He then sailed north to the Hellespont, and anchored at Lampsacus. An immense Athenian fleet soon made its appearance at Ægospotami, on the opposite side of the straits, amounting to 180 ships. Of these 171 were captured by Lysander a few days after. The blow to Athens was tremendous. Everywhere her colonial garrisons had to surrender, and Spartan influence predominated. Finally, in 404 B.C., he took Athens itself. His popularity now became so great, especially in the cities of Asia Minor, that the Spartan ephors dreaded the consequences, especially as they knew how ambitious he was. Every means was taken to thwart his designs, until finally it would appear that he had resolved to attempt the overthrow of the Spartan constitution; but this scheme was prevented by his death at the battle of Haliartus in the Bœotian war (395 B.C.).

LYSIAS, a Syrian nobleman, whom king Antiochus Epiphanes, setting out for Persia, appointed guardian of his son and regent of the kingdom, in which capacity he waged a formidable war with the Jews. His great army was defeated by Judas Maccabæus near Emmaus, 166 B.C. In the following year he was repulsed near Bethsura, but captured the fortress in 163 B.C., and besieged Jerusalem, but was compelled to withdraw by an insurrection at Antioch, shortly after which he was put to death by the populace of the latter city, who had rebelled in favor of Demetrius Sotes.

LYSIAS, b. Athens, B.C. 458. He was one of the ten Athenian orators, and the contemporary of the most distinguished men of Athens—Thucydides, Xenophon, Euripides, and Sophocles. His father was a man of wealth, was intimate with Pericles and Socrates, and his house was the scene of the celebrated dialogue of Plato's *Republic*. At the age of 15 Lysias went to Thurium, in the s. of Italy, with an Athenian colony, accompanied by the historians Herodotus and Thucydides, remaining there 32 years, and studying the art of eloquence under the two Syracusans, Tisias and Nisias. After the failure of the Athenian expedition in Sicily, he was obliged to leave Italy. Returning to Athens in 411, he carried on with his brother Polemarchus a large manufactory of shields, in which they employed 120 slaves. Athens fell into the hands of Lysander, and 30 tyrants were appointed to administer the affairs of the city. The wealth of the two brothers excited the cupidity of the tyrants; their house was attacked by an armed force while they were entertaining some friends at supper, their property seized, Polemarchus put to death, and Lysias, by bribing some of the soldiers, escaped to Megara. In his oration against Eratosthenes, one of the 30 tyrants, he has given a graphic sketch of his escape. At Megara he assisted Thrasybulus to free his country from the tyrants, supplying him with a large sum of money from his own resources, and hiring 300 men at his own expense. The tyrants having been expelled, Lysias returned to Athens in 403, where he began his career as an orator. Of the 475 orations ascribed to him, only 235 are regarded as genuine, and only 34 are extant. Dionysius of Halicarnassus, in

his critique of his works and style, says: "He was particularly distinguished for simplicity and precision, as well as for the fidelity with which he depicts the manners of the age." "In narrating events or circumstances," he considers Lysias "superior to all the orators." Quintillian compares him to "a clear and pure rivulet rather than to a majestic river." Cicero regards him as "the model of a perfect orator." The best editions of the orations of Lysias are those of J. Taylor (London, 1739), and of Reiske (Leipsic, 1722). Some of his orations have been translated into English by Dr. Gillies.

LYSIMACHIA, or LOOSESTRIFE, a genus of plants of the natural order *primulaceæ*, or primrose family, said to be named in honor of king Lysimachus (perhaps from λύσις, a release from, and μάχη, strife). Calyx, 5-parted (rarely 6 to 7); corolla, wheel-shaped, 5-parted (or 6 to 7), sometimes of as many separate petals; stamens of like number; pod globose, 5 to 10 valved. They are leafy stemmed perennials, generally with yellow flowers, axillary, or in a terminal raceme. Species grow in nearly all parts of the world, several in the United States, some being cultivated in gardens, as the MONEYWORT (*L. nummularia*), which was introduced from Europe. In this the leaves are roundish, small, with short petioles; peduncles axillary, one-flowered; ovate, acute sepals. It is a beautiful plant for hanging-baskets and for covering rocks, and also for carpeting beneath shrubs, forming, as it does, a thick mat. In some places it has escaped from the gardens into damp ground. It blooms from July to September. There are eight species enumerated by Gray as occurring in the United States: 1. *L. thyrsiflora,* or tufted loosestrife; stem from 1 to 2 ft. high, lower leaves reduced to scales, the rest lanceolate, the axils of one or two pairs of the middle ones bearing a short-peduncled spike-like cluster of yellow flowers; found in cold, wet swamps from Pennsylvania northwards; blooms in June and July. 2. *L. stricta:* leaves opposite or nearly alternate, lanceolate, acute at each end; flowers in a long raceme from 5 to 12 in., and leafy at the base; in variety producta, leafy for half the length; in low grounds, blooming from June to August. 3. *L. quadrifolia:* leaves whorled, in fours or fives, ovate-lanceolate; flowers on long capillary peduncles from the axils of the leaves; a common plant in the middle states, growing in moist or sandy soil, blooming in June. 4. *L. ciliata:* stem from 2 to 3 ft. high, leaves lanceolate-ovate, tapering to an acute point, on long and fringed leaf-stalks; common in low grounds and thickets; blooms in July. 5. *L. radicans:* stem slender, soon reclined, and often taking root from the joints; leaves ovate-lanceolate, borne on slender leaf-stalks; grows on swampy river banks in West Virginia and southward. 6. *L. lanceolata:* stem erect, 10 to 20 in. high; leaves lanceolate, oblong, and also linear, narrowing into the short petiole; growing on low grounds, westward and southward; blooming from June to August. 7. *L. longifolia:* stem erect, 4 angled, from 1 to 3 ft. high, often branched below; stem leaves sessile, linear, 2 to 4 in. long, smooth and shining, margins often revolute, veins obscure; corolla about ¾ of an inch in diameter, lobes pointed; grows in moist soil in western New York, Pennsylvania, to Wisconsin and Illinois; blooming from July to September. 8. *L. nummularia,* noticed above.

LYSIM'ACHUS, b. Pella, Macedonia, about 360 B.C.; a gen. of Alexander the great. He was a pupil of the philosopher Callisthenes, and was in his youth distinguished for bravery and physical strength. He was attacked by a lion in the forests of Syria, which he killed without assistance, from which probably originated the story told by Justin and Seneca of his being exposed to a furious lion and killing it by thrusting his cloak into its mouth. On the division of the empire at Alexander's death, 323, he received Thrace and the countries on the coast of the Euxine. He took possession of Thrace after conquering Seuthes, its king, and a powerful army. In B.C. 314 he joined the league formed against Antigonus by Ptolemy, Seleucus, and Cassander. In 306 he assumed the title of king. In 302 he was sent into Asia Minor to attack Antigonus, subduing on his way Phrygia, Lydia, and other places, taking possession of many strong fortresses in which Antigonus had collected immense treasure. On the approach of Antigonus he withdrew into Bithynia, where he was joined by Seleucus, and they, in 301, advanced against Antigonus and his son Demetrius. In the following year these two gens., aided by the forces of Ptolemy and Cassander, met Antigonus at Ipsus, where a fierce battle was fought; Antigonus was killed, and his dominions shared by the victors, Lysimachus obtaining the n.w. part of Asia Minor. In 292 he attacked Getæ, n. of the Danube, but was defeated, made prisoner, and released on giving his daughter in marriage to the king of the Getæ. In 288 he combined with Ptolemy, Seleucus, and Pyrrhus against Demetrius, who had invaded Thrace during his absence and captivity, drove him from Macedonia, became king thereof himself, and compelled Pyrrhus, who laid claims to the kingdom, to retire to his native dominions. The latter part of the life of Lysimachus was imbittered by domestic dissensions and intestine troubles. Having put to death his son Agathocles at the instigation of his wife, Arsinoe, the daughter of Ptolemy, king of Egypt, who feared that on the death of Lysimachus she and her children would be put to death by Agathocles, his subjects rose in rebellion, and Seleucus, at the entreaty of the widow of Agathocles, attacked Lysimachus, who was killed on the plain of Corus.

LYSIP'PUS, a celebrated Greek statuary; b. Sicyon, in the Peloponnesus; lived about 324 B.C. He was at first a workman in brass, then applied himself to the art of painting, and afterwards devoted himself to sculpture. He is said to have been self-

taught, and excelled in the study of nature rather than in copying the manner of any master. His peculiarity was that of making the head smaller and the body more slender and easy than his predecessors had done. His statues were admired for the beautiful manner of executing the hair. His contemporaries appreciated his talents; the different cities were eager to obtain his works; and Alexander, while he conferred on Apelles the sole right to paint his form, allowed no one but Lysippus to execute it in bronze. He is said by Pliny to have produced 1500 works of art. Among the most celebrated was a statue called "Apoxyomenos," representing a man scraping himself in a bath with a strigil, the removal of which, by order of Tiberius, from the baths of Agrippa to the palace of the emperor so excited the people that he was compelled to replace it. He made many statues of Alexander, representing him at different periods of his life, and in various positions; also, the equestrian statues of 25 Macedonians who fell at the passage of the Granicus, which Metellus transported to Rome. He executed a fine bronze statue of Cupid, with a bow; several statues of Jupiter, one of which, 60 ft. high, is at Tarentum; one of Hercules, which was removed to Rome; the Sun, drawn in a chariot by four horses; "Opportunity" (Kairos), represented as a youth with wings on his ankles on the point of flying from the earth. The sons of Lysippus, Dahippus, Bodas, and Euthycrates were his pupils; also, the renowned Chares, who executed the Colossus at Rhodes.

LYSONS, SAMUEL, 1763–1819; b. Rodmarton, England; educated for the bar, but relinquished the law for antiquarian pursuits; was made keeper of the records of the tower of London in 1803, and one of the directors of the society of antiquarians in 1812. He published, in 1797, *Roman Remains Discovered at Woodchester and Minchenhampton;* in 1801, his *Figures of Mosaic Pavements;* in 1802, his *Remains of Roman Antiquities at Bath;* in 1804, *Gloucester Antiquities.* He wrote also for the *Archæologia;* and assisted his brother Daniel in the preparation of the *Magna Britannia* in 1806–22.

LYSTRA, a city of Lycaonia in Asia Minor. It is worthy of note in sacred history as the place where Paul first had divine honors offered him and soon after was stoned; and also as being the native place of his companion and fellow-missionary, Timothy. It was in the eastern part of the great plain of Lycaonia. Its site is uncertain, but some have identified it with the ruins of Bin-Bir-Kilisseh, at the base of a volcanic conical mountain named the *Karadagh.*

LYTHRA'CEÆ, a natural order of exogenous plants, consisting of herbaceous plants, with a few shrubs; the branches frequentlyfour-cornered. The leaves are generally opposite, entire, and sessile. The flowers are solitary or clustered, regular or irregular, and either axillary, racemose, or spiked; the calyx tubular, the petals inserted into the calyx, very deciduous, sometimes wanting. The stamens are inserted into the tube of the calyx below the petals, sometimes equal to them in number, sometimes two or three times as many. The ovary is superior, generally 2 to 6 celled. The fruit is a membranous capsule with numerous seeds. There are about 300 known species, natives of tropical and temperate, or even of cold climates. Some of them are occasionally applied to medicinal uses, upon account of a stringent, narcotic, or febrifugal properties. Among those thus employed is the PURPLE LOOSESTRIFE (*lythrum salicaria*), a common British plant, growing in moist places and about the margins of ponds and streams, with beautiful leafy spikes of purple flowers; a decoction of either the root or the dried leaves of which is sometimes advantageously used in diarrhea. The henna (q.v.) of Egypt is produced by *Lawsonia inermis,* a plant of this order. The leaves of another (*pemphis acidula*) are said to be a common pot-herb on the coasts of the tropical parts of Asia. The leaves of *ammania vesicatoria,* an East Indian aquatic plant, are very acrid, and are sometimes used as blisters.

LYTHRUM (Gr. *λύθρον,* blood, from the crimson or purple color of the flowers), a genus of herbaceous plants, called also LOOSESTRIFE in common with lysimachia (q.v.), although belonging to another order, *lythraceæ.* Calyx cylindrical, striate, 5 to 7 toothed; petals, 5 to 7; stamens as many as the petals, or twice the number, inserted low down on the calyx; pod oblong, two-celled. The herb is slender, with opposite or scattered, mostly sessile leaves, and purple flowers. The *L. salicaria,* or spiked loosestrife, is a native of Europe, but is found in some of the older states in this country in wet meadows, particularly in New England and e. New York, where it is frequently cultivated; leaves lanceolate, heart-shaped at the base, sometimes whorled in threes; stamens 12, twice the number of petals, 6 longer and 6 shorter. It is a fine, tall, rather downy plant, with large flowers, from crimson to purple; perennial. By growing in dry places the plant becomes more downy and hoary, and considerably dwarfed. The herb has a mucilaginous, astringent taste. The blackish brown, branching, and fibrous root is also astringent, mucilage and tannin being its principal constituents. It has a place in pharmacopœias as a medicine, and is much used in Europe in diarrhea, dysentery, and passive hemorrhages. It is usually given in decoction made by boiling an ounce of the root in a pint of water, the dose being from one to two fluid ounces. The principal species indigenous to the United States are *L. hyssopifolia,* a low annual, from 6 to 10 in. high; leaves oblong-linear, obtuse, longer than the inconspicuous flowers; petals, pale purple, 5 to 6 in number; stamens the same; found in marshes on the coast of New England and New Jersey. *L. alatum*: tall and wand-like; perennial;

leaves from oblong-ovate to lanceolate; color deep purple; growing in Michigan, Wisconsin, and southward. *L. linearе*: stem slender and tall, from 3 to 4 ft., bushy at the top; leaves linear, short, chiefly opposite; petals whitish; grows in brackish marshes in New Jersey and southward.

LYTTELTON, EDWARD, D.C.L., Baron, 1589–1645; b. at Mounslow, Shropshire, England; graduated at Oxford in 1609; appointed chief-justice of North Wales in 1621; elected to parliament in 1626; recorder of London in 1631; made solicitor-general and knight in 1634; chief-justice of common pleas in 1640; lord keeper of the great seal in 1641; and a peer in the same year. In 1642 he escaped with the great seal to Charles I. at York; was required by parliament in 1643 to restore it on pain of losing his place; appointed first commissioner of the treasury in 1644. Died at Oxford.

LYTTELTON, THOMAS, Lord, b. Devonshire, England, in the 15th c.; studied at Cambridge and at the inner temple, where he was a lecturer on law; was appointed by Henry VI. steward of the court of the palace, and in 1455 the king's sergeant. He traveled through the northern circuit as judge of assize. The excellence of his character and his fame as a lawyer procured for him the favor both of the Lancastrians and Yorkists during their long struggle, and Edward IV. in 1462 offered him a general pardon, confirming to him also the offices of king's sergeant and judge of assize. In 1466 he appointed him one of the judges of common pleas, and made him a knight of the order of the bath. He was buried in Worcester cathedral, where a marble tomb, surmounted by a statue, was erected to his memory. His great work on *Tenures*, written in Norman French, composed while he was judge of common pleas, was printed after the author's death, and published in English in 1539. Sir Edward Coke wrote a commentary on it, now known by the title of *Coke upon Lyttelton*

LYTTLETON, GEORGE, Lord, son of sir Thomas Lyttleton of Hagley, in Worcestershire, was b. in 1708–9, and educated at Eton and Christ-church, Oxford. He entered parliament in 1730, held several high political offices, was raised to the peerage in 1759, and died in 1773. Lyttleton had once a considerable reputation as an author. His best known works are *Observations on the Conversion and Apostleship of St. Paul* (1747), *Dialogues of the Dead* (1760), and *History of Henry II.* (1764).—He had a son, THOMAS, Lord LYTTLETON, who died young, and who was as conspicuous for profligacy as his father for virtue.

LYTTON, Lord, better known as Sir EDWARD GEORGE EARLE LYTTON BULWER, Bart., the youngest son of gen. Bulwer of Woodalling and Haydon Hall, Norfolk, was b. in 1805, and received his education at Cambridge, where he graduated B.A. in 1826, and M.A. in 1835. He was distingished as a writer and as a politician, and his achievements in these diverse fields may be noticed separately.

His first publication was a poem on *Sculpture*, which gained the chancellor's prize for English versification at Cambridge in 1825. In 1826 he published a collection of miscellaneous verse, entitled *Weeds and Wild Flowers*, and in the year following a tale in verse with the title *O'Neill, or the Rebel.* In 1827 his first novel, *Falkland*, was published anonymously. Next year he published *Pelham*, which astonished the critics by its cynicism and its icy glitter of epigram. *The Disowned*, *Devereux*, and *Paul Clifford* followed in rapid succession. In 1831 he broke into more passionate and tragical regions in *Eugene Aram*, and after that ceased for a period to convulse the libraries. About this time he succeeded Campbell as editor of *The New Monthly Magazine*, and contributed to its pages a series of papers which were afterwards collected under the title of *The Student.* In 1833 he produced his *England and the English.* In 1834 he returned to fiction, and published in an illustrated form *The Pilgrims of the Rhine.* This was followed by *The Last Days of Pompeii*, a work of a higher class than any of his former productions. *Rienzi* followed in the same splendid vein, and received the same admiration. His next work was a play in five acts, *The Duchess of La Vallière*, which was put on the stage in 1836, and failed. *Ernest Maltravers* came the year after, which, as containing his views on art and life, has ever been a favorite with his more thoughtful readers. In the same year he published *Athens; its Rise and Fall*, full of research and splendid rhetoric. *Leila* and *Calderon* appeared in 1838. His next efforts were in the difficult walk of the drama, in which he had formerly failed. He produced *The Lady of Lyons* and *Richelieu*, both of which remain among the most popular of modern English plays.

Lytton's next important work was *Zanoni*, which was published in 1842, and in the same year appeared his poem entitled *Eva.* Other poems were issued—*The New Timon* in 1846, and *King Arthur* in 1848, the former containing couplets turned with the grace and art of Pope. His next novels were *The Last of the Barons*, *Harold*, and *Lucretia;* and thereafter he adopted a new walk of fiction, and achieved his greatest triumphs *The Caxtons*, a domestic novel, gave the world the crowning proof of Lytton's versatility. This work was followed by *My Novel*, one of his finest productions. After that he published *What will he do with it?* and a clever poem entitled *St. Stephen's.* In 1861 *A Strange Story* appeared in *All the Year Round;* and in 1863 he contributed to *Blackwood* a series of essays under the title of *Caxtoniana*, which were republished in two vols the same year. *The Lost Tale of Miletus* was published in 1866; and a translation of *Horace's Odes* three years later, as also *Walpole*, a comedy. Inaugural addresses o

his as lord rector of Edinburgh and Glasgow (he was elected to this high office twice in Glasgow) universities, respectively, have been published. Lytton contributed, besides, many valuable critical articles to the *Quarterly*, *Edinburgh*, and *Westminster Reviews*. *The Reign of Terror*, which appeared in the *Foreign Quarterly Review*, is a remarkable treatise. His latest works of artistic fiction were *The Coming Race*, published anonymously in 1871; *Kenelm Chillingly*, 1873; and *The Parisians*, which appeared originally in *Blackwood's Magazine* in 1873. These publications show that, to the end, the natural force of his genius had not abated. A collection of his *Speeches* appeared in 1874.

At the age of 26 Lytton entered parliament as member for St. Ives, and attached himself to the reform party. In 1832 he was returned as member for Lincoln, and held that seat till 1841. In 1835 he received his baronetcy from the Melbourne administration ostensibly for brilliant services rendered to his party as a pamphleteer. In 1844 he succeeded, on the death of his mother, to the Knebworth estates, and sought to return to parliament; in 1847 he contested Lincoln unsuccessfully; and in 1852 he was returned as member for the county of Herts, and attached himself to the party headed by lord Derby. During the Derby administration (1858–59) he was colonial secretary. He did not shine as a debater, but several of his parliamentary speeches were eloquent and telling. He died in 1873.

LYTTON, EDWARD ROBERT BULWER-LYTTON, Lord. See BULWER-LYTTON, EDWARD ROBERT, Earl.

M

M, THE thirteenth letter of the English alphabet, is the labial letter of the class of liquids. See LETTERS. Its Hebrew name is *Mem*, i.e., "water," and its original form was probably a waving line representing water. M is liable to many changes, and often disappears altogether. The Greek *molubdos* corresponds to Lat. *plumbum;* an old form of Lat. *bonus*, *benus*, or *belus*, was *manus*, which probably accounts for the comparative *melior*. See B. Final *m*, in Latin, was pronounced with such a weak, undecided sound that it was proposed to write it with half the letter; hence also, before the spelling of the language had become fixed, it had in many cases been altogether dropped, as in *lego* for *legom*. See INFLECTION. The nasal sound in final *m* in French seems to be a relic of the Roman pronunciation.

M OR N, in Catechisms. M is a contraction of N N (names); N is for name: the respondent is required to give his *names*, if he has more than one, or his name, if only one. In the marriage service, M stands for *mas* (the man), or *maritus* (the bridegroom); and N. for *nupta* (the bride). Some think that M stands for *Mary*, the patron saint for females, and N for *Nicholas*, the patron saint for men.

MAAS (Lat. *Mosa*, Fr. *Meuse*), a large affluent of the Rhine, rises in France, in the department of Haute-Marne, near the village of Meuse, flows in a northerly direction through France, Belgium, and Limburg, and then eastward through Holland to the German ocean From its junction with the Waal, a branch of the Rhine, to the mouth of the Yssel, it is called the Mervede. At Dordrecht, it divides into two branches, inclosing the island of Ysselmonde—of these, the northern is called the Nieuwe Maas (New Maas), the southern the Oude Maas (Old Maas). These branches unite on the eastern side of the island of Rozenburg, after which the river falls into the North sea, in long. 4° 5′ east. Its entire course is 500 m. in length, for 360 m. of which (from Verdun, in the department of Vosges, France, to the mouth of the river) it is navigable. The area drained by the Maas is estimated at 19,000 sq. miles. Its principal affluents are the Sambre and the Dieze, on the left; and the Ourthe, the Roer, and the Niers, on the right. Of the important towns on the banks of the Maas, the principal are Namur, Liége, Maastricht, Gorkum, Dort, and Rotterdam.

MAAS'TRICHT, or MAESTRICHT (called by the Romans *Trajectum ad Mosam*, to distinguish it from *Trajectum ad Rhenum*, now Utrecht), is a very old and important fortified town, capital of the province of Limburg, kingdom of the Netherlands. Pop. '74, 28,650. Maastricht is on the left bank of the river Maas, which separates it from the town of Wijk, the connection being maintained by a stone bridge, 500 ft. in length, resting on nine arches, and defended by small fortified islands. The town was founded in the 5th c., the seat of the bishop being transferred thither after Attila had plundered Tongres, in 451. It is 15 m. n. of Liége, 18 w. of Aix-la-Chapelle (Aken), and pleasantly situated in a hilly district. The streets are broad, and the houses regularly and well built, giving an air of beauty and respectability to the town. There are many paintings and a select public library in the town-house, a large square stone building, ornamented with a tower, and standing on the great market. Maastricht has one Lutheran, one Dutch Reformed, one French Reformed, and four Roman Catholic churches; also a Jewish synagogue; three hospitals, two orphan-houses, an athenæum, and other public buildings. The plains are shaded with trees and refreshed by fountains. There is railway communication with all parts of the Netherlands, Germany, Belgium, and other

countries of the continent. Maastricht has a very considerable trade with Bois-le-duc and other places. Leather, woolen stuffs, stockings, blankets, flannels, starch, madder, pins, etc., are manufactured; soap-boiling, gin-distilling, brewing, sugar-refining, and iron-founding add to the prosperity of the town.

Maastricht has often felt the scourge of war, and the evils incident to a frontier fortified town. It is surrounded by broad and deep canals, which contribute to its defensive strength. It is commanded by the hill of St. Pierre, formerly called *Mons Hunnorum*, a soft, calcareous mountain, which has been very extensively mined, forming a cavernous labyrinth of several leagues in length. Among other fossils, have been found in these workings two heads of the gigantic mosasaurus.

MAB, in northern mythology, the queen of the fairies; though some authorities have it that queen, in this use, should be *quean*, signifying female, as adapted from the Saxon *cwe'n*. In opposition to this is the Welsh meaning of the word, "a boy," but the frequent use of it by poets in its significance of fairy-queen has caused it to be popularly accepted in that sense. The speciality of Mab, as attributed in English poetry, is to act as the "fairies' midwife," who delivers the brain of dreams. Thus when Romeo says: "I dreamed a dream to-night," Mercutio replies, "O then, I see queen Mab hath been with you." Mab appears in the poems of Ben Jonson, Herrick, and Drayton: Shakespeare's description of her, placed in the mouth of Mercutio, is well known:

> She is the fairies' midwife, and she comes
> In shape no bigger than an agate-stone
> On the fore-finger of an alderman,
> Drawn with a team of little atomies
> Athwart men's noses as they lie asleep, etc.
>
> —*Romeo and Juliet*, Act I., Sc. IV.

MABILLE, or JARDIN MABILLE, a place in Paris famous for brilliant public balls held nightly, which are frequented by the gay, rollicking youth of all countries, and by travelers drawn thither by curiosity, in numbers almost equal to those of Parisian visitors. Fantastic revelry, marvelous dancing, intoxicating music are the attractions in the midst of a panorama made gorgeous by the blaze of 3,000 gas jets shaded into all colors to light the ball-room, the passages, the alcoves, and the groves of this fairy garden of men, women, and flowers. The garden, established in 1840, is on the s. side of the Champs Elysée. That part of the garden which is under roof, and that which has only the boughs of trees and the sky above it are so blended that one hardly notices whether he is under one or the other. Formerly youth who went for their own pleasure were the main performers in the grotesque extravagances of the dancing. Of late years, however, professional *dansantes* are employed to astonish visitors, by whom they can be distinguished from other revelers only by the extraordinary fantasies of their performances. One of their characteristic feats is to lift a toe suddenly to the head of a dancer or astonished visitor who presses too near the dancing circle, to dash a hat from his head without touching his face or arresting their own swift course in the dance. The visitors to the Mabille are from every part of the world. Middle-aged, portly Englishmen, Americans, Turks, Arabs, Russians, and even their ladies are seen in the throng around the dancers, and go prepared to be trifled with. France furnishes the larger part of the men who enter frankly into the hilarity of the dancing scenes and all of the peculiarly supple, fascinating, and soiled women. Though physical exuberance of joy and fuss is allowed the widest license in the dance, vulgarity of language is very rare, and when exhibited results in quick expulsion of the offender. It is thought that the resort is not so largely attended or in so good repute as formerly with English and American travelers of the cultivated classes; and it would seem that a proper taste—not to speak of decency—might operate against its peculiar style of attraction.

MABILLON, JEAN, a learned Benedictine, b. Nov. 23, 1632, at St. Pierremont, in Champagne. He studied at the collége de Reims; assisted D. Luc d'Achery in his labors upon his vast historic *recueil*, entitled *Spicelegium;* undertook an edition of the works of St. Bernard; and in 1668, published the first volume of the *Acta Sanctorum Ordinis S. Benedicti*, of which the last part appeared in 1702. His classical work *De Re Diplomaticâ* appeared at Paris in 1681. Colbert offered him a pension of 2,000 livres, but he declined it. In 1683 Colbert sent him to Germany, to collect documents relative to the history of France, and he was afterwards sent to Italy for a similar purpose. He died in Paris, Dec. 27, 1707. His *Vetera Analecta* (4 vols. Par. 1675–85), and *Musæum Italicum, seu Collectio Veterum Scriptorum ex Bibliothecis Italicis eruta* (2 vols. Par. 1687–89), contain part of the fruits of his laborious and erudite researches.

MABLY, GABRIEL BONNOT DE, 1709–85, b. France; educated for the priesthood among the Jesuits of Lyons, and novitiated in the seminary of St. Sulpice, Paris. He resigned the priestly calling, and attracting the attention of cardinal De Tensin by the solidity of his conversation on state affairs, was attached to the bureau of the minister of foreign affairs, and became a power among the ministers. After acquiring high position he broke with his patron the cardinal, because the former resolved to pronounce Protestant marriages null. Living in retirement he became author of works calling attention to the noble thoughts of Greek and Roman authors, and to their wisdom in government. He looked backward and not forward for his ideals, and failed to per-

ceive progressive development in modern civilization. In 1784, in a publication entitled *Observations sur le gouvernement et les lois des Etats Unis d'Amerique*, he predicted the early downfall of the United States, if they continued in the mercantile road. In his old age he saw nothing that gave him encouragement that the world was not going to the bad, and obtained the surname of "Prophet of Evil." His early writings, after his retirement, are remarkable for the clearness with which they depict the danger of character which comes to nations with increase of wealth and luxuries, and show that commerce and the arts serve but to corrupt peoples without adding to their real happiness. Sparta with the Jesuit college grafted on it, was his ideal community. Mably's writings were the source of many of the most radical and one-sided hobbies of French socialists and agrarians; and while he intended them to fortify respect for the more ancient forms of social life, they became the seed of the wildest democratic vagaries. He demanded the abolition of individual property, of the laws of inheritance, the suppression of commerce, of education, of amusements. Agriculture and the gymnasium as in Sparta, a state religion tolerating no other—these were the ends of his philosophy. "It is better" he writes, "that there should be but a million happy men upon all the earth, than the innumerable multitude of *miserables* and slaves who live a half-life in the midst of misfortunes." Such crude and half-sided philosophy formed the school in which Marat, St. Just, and Babeuf found apology for their fanaticism.

MABUSE, JAN DE (GOSSAERT), 1499–1562; a Flemish painter who executed pictures of the three children of Henry VII. of England, also "Adam and Eve," "Christ and the Rich Young Man," which are in the Kensington gallery. After visiting Italy in 1532–33, he returned to Germany where his works are numerous and valued to this day. "Neptune and Amphytrion," in the museum of Berlin is one of his best. The Louvre has a great number of his pictures of religious subjects.

MAC, or **M'**, a Gaelic prefix occurring frequently in Scottish names, means "son," and is probably allied to the Gothic *magus*, a son, a boy, the feminine of which is *magaths* (Ger. *magd*, a maid). The root is probably the Sanskrit *mah*, to grow (see G). In Welsh, *magu* means to breed. The Welsh form of *Mac* is *Map*, shortened into *'ap* or *'p*, as Ap Richard, whence Prichard.

MACADAM, JOHN LOUDON, was b. in Scotland in 1756, and passed his youth in the United States. On his return, he was appointed manager of a district of roads in Ayrshire, and originated and successfully practiced the system of road-making now known by his name. In 1819, he was summoned to England, and was appointed by parliament to superintend the roads in the Bristol district, which were in a most deplorable condition. In 1827 he was appointed general surveyor of the metropolitan roads; and in reward of his exertions to render them efficient, received a grant of £10,000 from government. His system rapidly became general throughout England, and was also introduced into France with great success. Macadam died at Moffat, in Dumfriesshire, in 1836. The principles of his system, which is known as *Macadamizing*, are as follow: "For the foundation of a road, it is not necessary to lay a substratum of large stones, pavement, etc., as it is a matter of indifference whether the substratum be hard or soft; and if any preference is due, it is to the latter. The metal for roads must consist of *broken stones* (granite, flint, or whinstone is by far the best); these must in no case exceed 6 oz. each in weight, and stones of from 1 to 2 oz. are to be preferred. The large stones in the road are to be loosened, and removed to the side, where they are to be broken into pieces of the regulation weight; and the road is then to be smoothed with a rake, so that the earth may settle down into the holes from which the large stones were removed. The broken metal is then to be carefully spread over it; and as this operation is of great importance to the future quality of the road, the metal is not to be *laid* on in shovelfuls to the requisite depth, but to be *scattered* in shovelful after shovelful, till a depth of from 6 to 10 in., according to the quality of the road, has been obtained. The road is to have a fall from the middle to the sides of about 1 ft. in 60, and ditches are to be dug on the field-side of the fences to a depth of a few inches below the level of the road." This system, which at one time threatened to supersede every other, is calculated to form a hard and impermeable crust on the surface, thus protecting the soft earth below from the action of water, and so preventing it from working up through the metal in the form of mud. Strange to say, it has succeeded admirably in cases where a road had to be constructed over a bog or morass, but in some other circumstances, it has been found deficient. See ROADS.

McALLISTER, FORT, a strong earthwork, erected by the confederates during the war of the rebellion on Genesis point, on the right bank of the Great Ogeechee river, 6 m. from Ossabaw sound, and 12 m. s. of Savannah, Ga. It successfully resisted the fleet of monitors under commodore Worden in 1863, but was taken by assault by the 2d division of the 15th corps under gen. Hazen, Dec. 13, 1864, with a loss of 90 men. This was the closing feat of Sherman's "march to the sea," and led to the surrender of Savannah a few days later.

McALPINE, WILLIAM J.; b. New York, 1812; after completing his classical education, he began engineering in 1827, under John B. Jervis, with whom he remained 12 years, during which time he was employed upon the Delaware and Hudson canal and

railroad, and upon other public works, under the direction of his chief. He was the successor of Mr. Jervis as engineer of the eastern division of the Erie canal enlargement until 1846, when he was chosen to construct the dry-dock at the Brooklyn navy-yard. In 1852 he was elected state engineer of New York. In 1854–56 he was railroad commissioner of the state, in which capacity he made a valuable report upon the principles and practice of railroad construction and management. Afterwards, for two years, he was engineeer and acting president of the Erie railroad, later still, engineer of the Galena and Chicago, and of the Ohio and Mississippi railroads. He constructed the water-works of Chicago and Albany, and planned those for Brooklyn and New Bedford. In 1870 he presented plans, which were accepted by the Austrian government, for the improvement of the cataracts of the Danube.

MACAO', a Portuguese settlement on the coast of China, in lat. 22° 11′ n., and long. 113° 33′ e., on the western part of the estuary of the Canton or Pearl river, Hong-Kong being about 40 m. distant, on the opposite side of the same estuary. The settlement, which is about 8 m, in circuit, is on a small peninsula, projecting from the south-eastern extremity of the large island of Hiang-shan. Its position is very agreeable, nearly surrounded with water, and open on every side to the sea-breezes, with a good variety of hill and plain. The town is slightly defended by some forts. Daily steam communication is maintained with Hong-Kong. The principal public buildings are the cathedral and churches. It is one of the most salubrious ports in China, with full exposure to the s.w. monsoon, and recent sanitary improvements have added greatly to its healthiness. The maximum temperature is about 90°, the minimum about 43°. The population is about 80,000, 10,000 of whom are Portuguese and other foreigners. The Portuguese obtained permission from the Chinese authorities in 1557 to settle in Macao on account of the assistance they gave in hunting down a pirate-chief whose head-quarters were in this island. The Chinese, however, held, until recently, a lien upon the place, requiring of the Portuguese 500 taels ground-rent, retaining also jurisdiction over their own people. The privileges obtained by England through the treaty of Nankin were subsequently extended to the Portuguese, who, by successive aggressions, have become wholly independent of the Chinese. The anchorage at Macao is defective. The Typa anchorage lies about 3 m. off the southern end of the peninsula; but large vessels cannot approach nearer the shore than 6 miles. After the rise of Hong-Kong, the commerce of Macao almost entirely disappeared. Some years ago a suspicious trade in coolies sprung up; but in 1873 the British government forbade ships carrying on this traffic to enter any of the treaty-ports, and on Dec. 20 of that year the Portuguese government abolished the trade. Here Camoens, in exile, composed his *Lusiad*.

MACAPÁ, a t. in Brazil, on the Amazon, 130 m. from its mouth; pop. 7,500. It is a fortified town, the harbor and river being defended by a fort overlooking them. The town is well built and regularly laid out; public buildings are a town-hall, church, school-house, prison, and hospital. There is a good export trade in cacao, tropical fruits, millet, rice, cotton, and fine woods.

MACAQUE', quadrumana belonging to the family simidæ, and to that section denominated by Bowen catarrhine, or the old-world monkeys. They constitute the genus *macacus* of which there are several species. There has been some confusion in the classification of these animals. The name first appears in Marcgrave's *Natural History of Brazil*, as the name of a monkey of Congo and the coasts of Guinea. The application of the title to an Asiatic species of an entirely different genus was an error of Buffon's—perhaps unavoidable when made by him. Lacépède latinized the word macaque (or macaco), the native title, and applied it to the genus. There are also different statements made as regards the habitat of the apes to which the term is now applied, for it is often stated that the macaques are natives of Africa as well as of Asia and Gibraltar, whereas Mivart, in his little book *Man and Apes*, distinctly states that "the macaci, or macaques, are not found in Africa, but they extend farther north than any other of the monkeys." Two species, he says, are found in Japan and at Gibraltar, called respectively *M. speciosus*, and *M. inuus*. An Indian macaque, called the rhesus, inhabits many parts of Hindustan in great numbers. (See RHESUS MONKEY, *ante*.) The wanderoo, or *M. silenus* of the Indian archipelago, is another macaque (see WANDEROO, *ante*). The *M. inuus*, the Gibraltar monkey, is regarded by some as a distinct genus from the Japan ape, and is called *inuus sylvanus*, or the Barbary ape (q.v.). The following species of *macacus* are given in the British museum catalogue: *M. radiatus*, the zati, or capped macaque, sometimes called the toque; *M. sinicus*, the munga, or bonnet macaque; *M. nemestrinus*, the bruh; *M. cynomolgus*, the macaque; *M. rhesus*, the rhesus; *M. oinops*, the oinops; *M. speciosus*, the Japan ape; *M. juncus*, the magot, and *M. niger*. The macaques have cheek pouches and large ischial callosities; the length of tail also varies in different species, being rudimentary in some and long in others. Many of the monkeys seen in menageries are macaques. When young they are docile and active, but as they grow old they become morose and exhibit some of the ferocity of their cousins the baboons. See QUADRUMANA.

MACARO'NI (originally lumps of paste and cheese squeezed up into balls; from It. *maccare*, to bruise or crush), a peculiar manufacture of wheat, which for a long time was peculiar to Italy, and, in fact, almost to Genoa; it is now, however, made all over

Italy, and at Marseilles and other places in the south of France. Strictly speaking, the name macaroni applies only to wheaten paste in the form of pipes, varying in diameter from an ordinary quill up to those now made of the diameter of an inch; but there is no real difference between it and the fine thread-like vermicelli, and the infinite variety of curious and elegant little forms which, under the name of *Italian pastes*, are used for soups.

Only certain kinds of wheat are applicable to this manufacture, and these are the hard sorts, which contain a large percentage of gluten. At present, the Italian manufacturers prefer the wheats of Odessa and Taganrog; but they also employ those of their own country grown in Sicily and in Apulia. The wheat is first ground into a coarse meal, from which the bran is removed—in that state it is called *semola* (see also SEMOLINA); during the grinding, it is necessary to employ both heat and humidity, to insure a good semola. The semola is worked up into a dough with water; and for macaroni and vermicelli it is forced through gauges, with or without mandrels, as in wire and pipedrawing; or for *pastes*, it is rolled out into very thin sheets, from which are stamped out the various forms of stars, rings, etc.

The manufacture of this material is of great importance to Italy, where it forms a large article of home consumption, and is exported to all parts of the world. In Genoa alone nearly 170,000 quintals of wheat are annually consumed in this manufacture. The finest qualities of macaroni are those which are whitest in color, and do not burst or break up in boiling; it should swell considerably, and become quite soft; but if it does not retain its form when boiled, it has not been made of the best wheat. Some makers flavor and color it with saffron and turmeric, to suit certain tastes, but this is limited to very few. The use of macaroni and its varieties is rapidly increasing in Great Britain, where it is employed in soups, in puddings, and for making the favorite dish of macaroni and cheese.

MACARONIC VERSE is properly a kind of humorous poetry, in which, along with Latin, words of other languages are introduced with Latin inflections and construction; but the name is sometimes applied to verses which are merely a mixture of Latin and the unadulterated vernacular of the author, of which a very clever specimen are the lines of Porson on the threatened invasion of England by Bonaparte, entitled *Lingo drawn for the Militia* (see Wheatley's *Anagrams*, etc.). Teofilo Folengo, called Merlino Coccajo, a learned and witty Benedictine, who was born at Mantua in 1484, and died in 1544, has been erroneously regarded as the inventor of macaronic poetry; but he was the first to employ the term, selected with reference to the mixture of ingredients in the dish called macaroni. His *Maccaronea* (Tusculanum, 1521, and many editions) is a long satiric poem, in which Latin and Italian are mingled. Fortunately, macaronic poetry has not been very extensively cultivated, although specimens of it may be found in the literature of almost all European countries. The idea of it was probably first suggested by the barbarous monkish Latin. There is a history of macaronic poetry, and a collection of the principal works of this kind by Genthe (Halle, 1829). Compare also Octave Delepierre's *Macaroneana*, Paris, 1852), and his *De la Littérature Macaronique et de quelques Raretés Bibliographiques de ce Genre* (vol. ii., *Miscellanies of Philobiblon Society*, Paris, 1856).

MACAROON (from the same root as macaroni), a favorite kind of biscuit, made with the meal of sweet almonds, instead of wheaten or other flour. The most esteemed formula for making macaroons is either prepared almond-meal dry, or, what is still better, almonds just blanched and beaten into a paste, one pound, thoroughly incorporated with a pound and a half of refined sugar in powder, an ounce of the yellow part of fresh lemon-peel grated fine, and the whites of six eggs. When thoroughly mixed, the paste is made into the shape of small oval biscuits, and placed on sheets of wafer-paper, and baked; afterwards, the superflous wafer-paper is trimmed off, and the macaroons are ready for use.

MACARSCA, or MARKASKA, a t. of the Austrian empire, in Dalmatia, on a small bay of the Adriatic, near the mouth of the Narenta, and 34 m. s.e. from Spalatro. The plague carried off half the inhabitants in 1815 and 1816, and the place has not yet completely recovered its prosperity. It carries on some trade, but the greater number of the inhabitants are employed in agriculture and fishing. Pop. 7,386.

MCARTHUR, DUNCAN, 1772–1839, b. N. Y.; his family removed to Pennsylvania in 1780, and in 1790 he served as a volunteer in Harmar's campaign against the Indians, and in later campaigns on the frontier. In 1805 he was elected a member of the legislature of Ohio, where he had settled and become a great landed proprietor. He entered the war of 1812 as colonel of an Ohio volunteer regiment, was promoted to a brig.-generalship in 1813, and the next year succeeded gen. Harrison as commander of the army of the west. He was a member of the Ohio legislature 1815–21, and a member of congress 1823–29. From 1830 to 1832 he was governor of Ohio.

MCARTHUR, JOHN, 1766–1834, b. England; a captain in the British army. While in the service in Australia in 1790, he secured a tract of land in the neighborhood of Sydney, and turned his attention to the development of the wool industry, making importations of sheep from Africa and Europe. His efforts attracted the attention of

the home government, which made him a grant of 10,000 acres of land; and he was the first to cultivate the ordinary vegetable crops on any large scale in Australia.

MACARTNEY, GEORGE, Earl, 1737–1806; b. Lissanoure, near Belfast, Ireland; graduated at Trinity college, Dublin, 1757; studied law in London; then made the tour of Europe, and on his return in 1764 was appointed envoy extraordinary to the empress of Russia, to conclude a commercial treaty with that country, which after some difficulty he accomplished. Returning in 1767 and sitting for a time in the British parliament, he became in 1769 chief secretary for Ireland. Retiring from this office in 1772 he was created knight of the bath. Appointed governor of the island of Grenada in 1775, he was taken prisoner on the capture of that island by the French in 1779, but was soon released by Louis XVI., and allowed to return to England. In 1776 he was raised to the Irish peerage by the title of baron Macartney. In 1780 he was appointed governor of Madras, but resigned in 1786 on account of ill-health, and for the same reason declined the appointment of governor-general of India. Soon after his return home he was wounded in a duel with maj.gen. Stuart, an officer whom he had found it necessary to remove from the service when in India. In 1788 he took his seat for the first time in the Irish house of peers, and in 1792 was made an Irish viscount, and sent ambassador extraordinary to Pekin, the first British envoy sent to China. In 1794 he was made earl Macartney in the Irish peerage, and returned from China the same year. In 1795 he was sent on a confidential mission to Italy. In 1796 he was made a British peer by the title of baron Macartney, and appointed governor of the newly captured territory at the cape of Good Hope. In 1798 he resigned on account of declining health, and for the same cause declined the offer of a seat in the cabinet of the Addington ministry in 1801. An account of his public life, with a selection from his unpublished writings, was published by his private secretary, sir John Barrow, in 2 vols. Sir George Staunton, his secretary to China, wrote an account of his Chinese embassy in 2 volumes.

MACARTNEY COCK, *Euplocomus ignitus*, a splendid gallinaceous bird, also called the FIRE-BACKED PHEASANT, a native of Sumatra and other islands of the same part of the world. It was first described in the account of lord Macartney's embassy to China. The entire length of the adult male is about two feet. The sides of the head are covered with a bluish-purple skin. The crown of the head has an upright crest of feathers with naked shaft, and a number of slender spreading barbs at the tip. The tail, when depressed, is forked; when erect, it is slightly folded, as in the common fowl. The general color is a deep black, with blue metallic reflections; the middle of the back, brilliant orange; the tail, bluish green, orange, and white. The female is smaller, and almost entirely of a rich brown color. The head is not crested, as in the male, but the hind feathers are lengthened.—The genus *euplocomus* is allied both to *gallus* (fowl) and *phasianus* (pheasant), and perhaps still more nearly to *lophophorus* (impeyan). Two or three splendid East Indian species are referred to it.

MACASSAR, the most southern portion of Celebes (q.v.), lies in lat. 4° 35′ to 5° 50′ s., and long. 119° 25′ to 120° 30′ e.; it is traversed by a lofty chain of mountains. Macassar was formerly the greatest naval power among the Malay states, but is now divided into the Dutch possessions and Macassar proper, which is of little importance, and governed by a native king, who pays tribute to the Netherlanders. The natives are among the most civilized and enterprising, but also the most greedy, of the Malay race. They carry on a considerable trade in tortoise-shell and edible nests, grow abundance of rice, and raise great numbers of horses, cattle, sheep, and goats; fishing is also extensively carried on. The Macassars are chiefly Mohammedans; the mosques are built of palm-wood. They are warlike, spirited, and impatient of a blow—their laws allowing them to avenge it by the death of the offender, if within three days.

MACASSAR, the chief town, is the residence of the Dutch governor and officials. It is situated on the strait of Macassar, which separates Celebes from Borneo, in 5° 10′ s. lat., and 119° 20′ e. long.; and is built upon a high point of land, watered by two rivers and smaller streams, surrounded by a stone-wall, and further defended by palisades and fort Rotterdam. Pop. about 20,000. The harbor is safe and convenient, but difficult to enter. Climate healthy, and all kinds of provisions plentiful. The exports consist of the various products of Celebes, which are brought from the settlements to Macassar for shipment. The chief of these are rice, sandal-wood, ebony, tortoise-shell, gold, spices, coffee, sugar, wax, cocoa-nuts, tobacco, opium, salt, edible nests, etc. The imports from China are principally silk fabrics and porcelain; from the Netherlands, cotton and linen goods, fire-arms, opium, spirits, etc. A very large proportian of the export and import trade is carried on between Macassar and the free port of Singapore, about a third part being with Java. The annual imports amount to about £400,000, and the exports to the same value sterling. No import or export duties are charged.

The Portuguese first formed a settlement in Macassar, but were supplanted by the Dutch, who, after many contests with the natives, gradually attained to supreme power. In 1811 Macassar fell into the hands of the British, who, in 1814, defeated the king of Boni, and compelled him to give up the regalia of Macassar. In 1816 it was restored to the Dutch, and continues to enjoy a fair share of the mercantile prosperity of the Netherlands' possessions in the eastern archipelago.

MACASSAR OIL—so called from the district of Macassar, in the island of Celebes, whence it is exported—is a species of vegetable butter, of an ashen-gray color, and rancid odor.—This name has also been given in Britain to a patent preparation used for promoting the growth of the hair and preventing its decay. It is composed of olive oil, or oil of almonds, colored with Alkanet root, and mixed with perfumes.

MACAS'SAR, STRAIT OF, a body of water which separates the islands of Borneo and Celebes, and unites the Java sea with the sea of Celebes. It varies in width between 75 and 140 m., and is about 400 m. long. Its navigation is difficult, owing to shoals and rocks, and particularly in the months of January and February, when a strong current sets through it from north to south.

MACAUCO. See LEMUR, *ante.*

MACAU'LAY, CATHARINE (SAWBRIDGE), 1733–91; b. England; married in 1760 Dr. George Macaulay, a London physician; and after his death a clergyman named Graham. She published *The History of England, from the Accession of James I. to that of the Brunswick Line*, 8 vols., 1763–83; *Remarks on Hobbe's Rudiments of Government and Society*, 1767; *A Modest Plea for the Property of Copyright*, 1774; and other works. She was a pronounced republican and a friend of Washington, whom she visited in America in 1785.

MACAULAY, THOMAS BABINGTON, Lord, son of Zachary Macaulay, a West India merchant and eminent philanthropist, and grandson of the rev. John Macaulay, a Presbyterian minister in the w. of Scotland, was b. at Rothley Temple, Leicestershire, Oct. 25, 1800. He entered Trinity college, Cambridge, at the age of 18, where he acquired a brilliant reputation both as a scholar and debater. He twice won the chancellor's medal—first in 1819, for a poem on *Pompeii*, and again in 1820, for another on *Evening*, both of which were published. In 1821 he obtained the second Craven scholarship, took the degree of B.A. in 1822, was shortly after elected a fellow of Trinity, and then began to devote himself zealously to literature. The periodical to which he first contributed was *Knight's Quarterly Magazine;* for this he wrote several of his ballads, e.g., *The Spanish Armada, Moncontour,* and *The Battle of Ivry,* besides essays and critiques. In 1825 he took the degree of M.A., and in the same year made his appearance in the columns of the *Edinburgh Review* by his famous essay on Milton, the learning, eloquence, penetration, brilliancy of fancy, and generous enthusiasm of which quite fascinated the educated portion of the public. For nearly 20 years he was the popular, perhaps also the most distinguished, contributor to the *Blue and Yellow.* In 1826 he was called to the bar at Lincoln's Inn, but it does not appear that he practiced. The tide of political agitation was beginning to rise high, and Macaulay was borne along with the current. There can be no doubt that Macaulay was an immense accession to the whig party, for he believed in whiggism with a profound sincerity that has never been questioned; and he was able to present the grounds of his belief in a manner so powerful and attractive that his very opponents were charmed, and almost convinced. In 1830 he entered parliament for the pocket-borough of Calne (which was placed at his service by the marquis of Lansdowne) just in time to take part in the memorable struggle for reform, in favor of which he made several weighty and effective speeches. When the first reformed parliament assembled in 1832 Macaulay sat as member for Leeds, and at once took a prominent position in the house. He was now made secretary of the board of control for India; and in the following year went out to India as a member of the supreme council. Here he remained till 1838. His chief labor was the preparation of a new Indian penal code. A conspicuous feature of this code was the humane consideration it displayed for the natives (which drew down upon its author the hostility of the Anglo-Indians). On his return to England he resumed his political career, and was elected M.P. for the city of Edinburgh in 1839. In 1840 he was appointed war-secretary. While holding office he composed, appropriately enough, those magnificent martial ballads, the *Lays of Ancient Rome* (1842); and in the following year published a collected series of his *Essays* in 3 vols. In 1846 he was made paymaster-general. Macaulay had always been one of the most courageous and unflinching advocates of religious freedom: accordingly he had defended the Roman Catholic relief bill; his first speech in the house of commons was in support of the bill to repeal the civil disabilities of the Jews, and now he supported the Maynooth grant. At this period, unfortunately for Macaulay, Edinburgh was the arena of great ecclesiastical fermentation; and because he advocated a measure intended to moderate the natural discontent of Roman Catholics, he was ousted from his seat at the general election in 1847. Five years later (1852) Edinburgh did what it could in the way of reparation by re-electing Macaulay without a single movement made by him on his own behalf. In 1848 appeared the first two volumes of his *History of England from the Accession of James II.,* the popularity of which must have made even successful novelists envious; next year he was chosen lord-rector of the university of Glasgow, on which occasion he received the freedom of the city. When the third and fourth volumes of his *History* were published in 1855, they occasioned a furore of excitement among publishers and readers, "to which," it is said, "the annals of Paternoster row hardly furnish any parallel." In 1857 the French academy of moral and political sciences made him a foreign associate; and in the course of the same year he was raised to the peerage of Great Britain under the title of baron Macaulay of Rothley. His health, however,

had long been failing, and on Dec. 28, 1859, he expired somewhat suddenly at his residence, Holly Lodge, Campden Hill, Kensington, London. He was buried in Westminster abbey. Vol. V. of his *History*, a fragment, was published in 1861; and a complete edition of his works, by his sister, lady Trevelyan appeared in 1866. *The Life and Letters of Lord Macaulay*, by his nephew, George Otto Trevelyan, M.P., an able and fascinating biography, was published in 1876.

Macaulay was indisputably a man of splendid talent. His scholarship—in the strictly classical sense of the term—was admirable; his miscellaneous literary acquisitions were something prodigious; his knowledge of modern European, and especially of English, history from the age of Henry VIII. down to his own, was unsurpassed—we might with safety say, unequaled; in addition, he had a sagacity and swiftness of understanding that enabled him to comprehend and rapidly methodize his vast array of facts; and what is perhaps more wonderful than all, his style is not in the least affected by the immensity of his attainments. He "wears all his load of learning lightly as a flower." In ease, purity, grace, force, and point, he rivals those who have made felicity of style their chief study. He has been accused of partiality, of exaggeration, and of gratifying his passion for epigram at the expense of truth; his *History* has been termed a "huge whig pamphlet;" and strong exception has been taken to particular passages, where his views appear to some to be biased by personal antipathies, such as his description of Scotland, the Highlands, the massacre of Glencoe, Marlborough, Penn, etc.; but the essential truth and accuracy of his narrative, as a whole, has never been disproved.

MACAU'LEY, CATHARINE E., 1787–1841; b. Ireland. A wealthy man named Callahan, who had adopted her, left her at his death a considerable fortune, with which she founded in 1827, at Dublin, a home for poor women out of work; this was finally called the "institute of our blessed lady of mercy," and was devoted to the care of the sick. Miss MacAuley became superior of the order of the sisters of mercy to which the Dublin institution gave rise, and that order has since spread through Europe and America.

MACAW', *Macrocercus*, a genus of the parrot family (*psittacidæ*), distinguished by a very long wedge-shaped tail, long and pointed wings, large strong feet, the sides of the head naked, the bill short and very strong, the upper mandible greatly arched, and having a long sharp tip, the lower mandible much shorter, and of massive thickness. The species are among the largest and most splendid of the parrot race; they are all natives of tropical America. They do not readily learn to articulate, their attainments seldom exceeding one or two words, but are easily domesticated, and become much attached to those with whom they are well acquainted. Their natural notes are hoarse and piercing screams. They are more or less gregarious, and the appearance of a flock of macaws in bright sunshine is wonderfully brilliant. They breed twice a year, and lay their eggs—generally two—in the hollows of decayed trees. They feed chiefly on fruits and seeds; and often commit great depredations on fields of maize. One of the flock is set to watch on some elevated situation, and on the approach of danger, gives the alarm by a cry. In domestication, macaws readily eat bread, sugar, etc.—The GREAT SCARLET MACAW (*M. aracanga*) is sometimes more than 3 ft. in length, including the long tail.—The GREAT GREEN MACAW (*M. militaris*) and the BLUE AND YELDOW MACAW (*M. aravauna*) are rather smaller. These are among the best known species. The other species are numerous.—Allied to the macaws, but approaching to the parakeets, are the species forming the genus *psittacara*, all of them also natives of the new world. The cheeks are feathered, and the bill less arched than in the true macaws.—Allied to them also are the araras, of which one, the CAROLINA ARARA, or CAROLINA PARROT (*arara Carolinensis*), extends much further north in America than any other of the parrot family. It is about 14 in. long, gay with green and gold, is gregarious, and commits great depredations in orchards and maize-fields. It cannot be taught to articulate words, but readily becomes very familiar.

MACAW-TREE, GREAT, *Acrocomia sclerocarpa*, a palm of the same tribe with the cocoa-nut, a native of the West Indies, and of the warm parts of America. It is called *macoya* in Guiana, and *macahuba* in Brazil. It is from 20 to 30 ft. high, with pinnated leaves, from 10 to 15 ft. long. The fruit yields an oil, of a yellow color, of the consistence of butter, with a sweetish taste, and an odor of violets, used, in the native regions of the tree, as an emollient in painful affections of the joints, and extensively imported into Britain, where it is sometimes sold as *palm oil*, to be used in the manufacture of toilet-soaps.

MACBETH (or MACBEATHAD MACFINLEGH, as he is called in contemporary chronicles), a king of Scotland, immortalized by the genius of Shakespeare. From his father Finlegh, the son of Ruadhri, he inherited the rule of the province of Moray; and he became allied with the royal line by his marriage with Gruoch MacBoedhe, the granddaughter of king Kenneth MacDuff. In the year 1039 he headed an attack upon king Duncan MacCrinan, at a place called Bothgouanan (the "Smith's Bothy"), where the king was mortally wounded, but survived to be carried to Elgin, in Moray. Macbeth now ascended the throne, and his reign of 17 years is commemorated in the chronicles as a time of plenty. He made grants to the Culdees of Loch Leven, and in the year 1050 went in pilgrimage to Rome. Malcolm MacDuncan, or Ceanmore, the eldest son of king Duncan MacCrinan, had fled to England on his father's death; and in the sum-

mer of 1054, his kinsman, Siward, earl of Northumberland, led an English army into Scotland against Macbeth. That king was defeated with great slaughter, but escaped from the field, and still kept the throne. Four years afterwards, he was again defeated by Malcolm MacDuncan, and fleeing northwards across the mountain-range since called the Grampians, he was slain at Lumphanan, in Aberdeenshire, on Dec. 5, 1056. His followers were able to place his nephew, or step-son, Lulach, on the throne; and his defeat and death at Essie, in Strathbogie, on April 3, 1057, opened the succession to Malcolm, who three weeks afterwards, was crowned at Scone. This is all that is certainly known of the history of Macbeth. The fables which gradually accumulated round his name were systematized in the beginning of the 16th c. by the historian Hector Boece, from whose pages they were transferred to the chronicle of Hollinshed, where they met the eye of Shakespeare. Nearly half a century before his great play was written, Buchanan had remarked how well the legend of Macbeth was fitted for the stage.

McCABE, James D., Jr., b. Richmond, Va., about 1840; received his education at the Virginia military institute; began very early to write for the press, and during the rebellion employed his pen in the service of the confederacy. He has published a *Life of Lieut.-Gen. T. J. Jackson*, a *Memoir of Gen. A. S. Johnston*, and *The Life and Campaigns of Gen. R. E. Lee*. He has also written many poems and short stories.

MAC'CABEES, a word of uncertain meaning and origin. The founder of the Maccabean dynasty, Matithjahu (Asamonaios, Chashmonaj), a priest (not, as generally supposed, a high-priest, nor even of the family of high-priests), was the first who made a stand against the persecutions of the Jewish nation and creed by Antiochus Epiphanes. At the beginning of the troubles, he had retired, together with his five sons, Jochanan (Gaddes—Kaddish), Simon (Tassi—Mathes), Jehudah (Makkabi), Eleazar (Avaran—*Syr.* Chavin), Jonathan (Apphus), to Modiin, a small place between Jerusalem and Joppa, to mourn in solitude over the desolation of the holy city and the desecration of the temple. But the Syrians pursued him thither. He being a person of importance, Apelles, a Syrian captain, endeavored to induce him, by tempting promises, to relinquish his faith, and to embrace the Greek religion. He answered by slaying with his own hand the first renegade Jew who approached the altar of idolatry. This gave the sign to a sudden outbreak. His sons, together with a handful of faithful men, rose against the national foe, destroyed all traces of heathen worship, already established in Modiin and its neighborhood, and fled into the wilderness of Judah. Their number soon increased; and not long after, they were able to make descents into the adjacent villages and cities, where they circumcised the children, and restored everywhere the ancient religion of Jehovah. At the death of Mattathiah (166 B.C.), which took place a few years after the outbreak, Judah Makkabi (166–161 B.C.) took the command of the patriots, and repulsed the enemy, notwithstanding his superior force, at Mizpah (6,000 against 70,000), Bethsur (10,000 against 65,000), and other places, reconquered Jerusalem, purified the temple (feast of reconsecration—Chanuka), and reinaugurated the holy service (164 B.C.). Having further concluded an alliance with the Romans, he fell in a battle against Bacchides (161 B.C.). His brother Jonathan, who succeeded him in the leadership, renewed the Roman alliance, and taking advantage of certain disputes about the Syrian throne, rendered vacant by the death of Antiochus, acquired the dignity of high-priest. But Tryphon, the guardian of the young prince Antiochus Theos, fearing his influence, invited him to Ptolemais, and had him there treacherously executed. Simon, the second brother, was elected by the Jewish commonwealth to assume the reins of the national government, and was formally recognized both by Demetrius, Tryphon's antagonist, and by the Romans as "chief and ruler of the Jews." He completely re-established the independence of the nation, and the year after his succession (141 B.C.) was made the starting-point of a new era. The almost absolute power in his hands he used with wise moderation; justice and righteousness flourished in his days, and "Judah prospered as of old." But not long (7 years) after his accession to the supremacy, he was foully murdered (136 B.C.) by his own son-in-law, Ptolemy, who vainly hoped to succeed him. For the subsequent history of this family, see Jews; Hyrcanus; and Herod. The feast of the Maccabees—i.e., both of the sons of Mattathiah, and of the seven martyr children (2 Macc. 7)—is found in the Roman martyrology under the date of Aug. 1.

MAC'CABEES, BOOKS OF, certain apocryphal writings of the Old Testament, treating chiefly of the history of the Maccabees (q.v.). They are usually divided into four parts, or books; the first of which—the most important—comprising the period 175–135 B.C., relates the events which took place in Judæa, Antiochus IV. Epiphanes's misdeeds against the temple, the city, and the nation (ch. i., ii.); the rising of Mattathiah and his sons against the oppressor, the heroic deeds of Judah Maccabeus (iii.–ix.), of Jonathan (ix.–xii.), and Simon, until the election of Johannes Hyrcanus to the dignity of high-priest. The account, which bears the aspect of strict truthfulness, proceeds chronologically after the Seleucidian era. According to Origen and Jerome, this book was originally written in Hebrew. The author, probably a Palestinian, composed it partly from traditions, partly from official documents, after the death of Simon, during the high-priesthood of Johannes Hyrcanus, and it was shortly afterwards translated into Greek, Syriac, and Latin. The second book contains—1. Two letters from the Pal-

estinian to the Egyptian Jews, inviting them to celebrate the feast of the reinauguration of the temple (Chanukah), (i., ii.); and 2. An extract, with introduction and epilogue, from the five books of the Maccabees, by Jason of Cyrene. This second portion begins with the spoliation of the temple by Hesiodorus, under Seleucus Philopator, and ends with the death of Nicanor; thus embracing the period 176–161 B.C. The two letters are spurious, and of a late date; and the extract from Jason's work—to a great extent, only an embellished repetition of the first book of the Maccabees, of a partly moralizing, partly legendary nature—contains many chronological and historical errors, and bears altogether the stamp of being written for merely religious and didactic purposes. The date both of the original and the extract are very uncertain, but the latter does not seem to have been made before the middle of the 1st century B.C.

These two books (*Sifre Chashmonaim*) are the only ones received in the Vulgate, and declared canonical by the councils of Florence and Trent, and translated by Luther. The third and fourth, however, appear to have been altogether unknown to the western church. The former of these treats of an ante-Maccabean incident: the miraculous salvation of the Jews in Egypt whom Ptolemæus Philopator (221–204 B.C.) tried to force into idolatry. The style and general contents of this book point to an Alexandrine Hellenist as the author or compiler (about 200 B.C.); some investigators (Ewald, Grimm), however, are of opinion that the whole is a poetical invention, intended as a typical description of the circumstances of the Jews under Caligula. The fourth book, wrongly supposed to be identical with Josephus's *Supremacy of Reason*, contains, chiefly, the martyrdom of Eleazar and the seven brothers, and is probably also the work of an Alexandrine Jew living in Egypt—perhaps at the time of Herod the great—and belonging to the Stoic school. Declamations, dialogues, monologues, and the like, are of frequent occurrence, and impart to the book the character of a most artificial and strained composition. There is also a so-called fifth book of Maccabees to be found in the Polyglot, but only the Arabic and Syriac versions, not the Greek original—the unique MS. of which is supposed to have perished—are extant. See APOCRYPHA, BIBLE.

McCALL, GEORGE ARCHIBALD, 1802–68; b. Penn.; graduated at West Point in 1822; entered the army and was made first lieut. in 1829, capt. in 1836, and maj. in 1847. He served with distinction in the Florida and Mexican wars, was made inspector-gen. in 1850, and resigned in 1853. In 1861 he commanded a volunteer force called the Pennsylvania "reserve corps," receiving a maj.-gen.'s commission from that state. His corps was attached to the army of the Potomac, and he led it through part of the peninsula campaign of 1862, till the battle of Frazier's Farm, where he was taken prisoner. He was exchanged in August, but his health prevented his returning to the army, from which he resigned in Mar., 1863.

MACCALU'BA, an interesting mud volcano or air volcano of Sicily, situated not far from the road between Girgenti and Aragona. It is known to have been in a state of frequent activity for the last 15 centuries. It consists of a large truncated cone of barren argillaceous earth, elevated about 200 ft. above the surrounding plain, with wide cracks in all directions, and numerous little hillocks with craters, which at times emit a hollow rumbling noise, and throw up a fine cold mud mixed with water, a little petroleum and sulphureous gas. Reports like the discharge of artillery are occasionally heard; slight local earthquakes are felt, and mud and stones are thrown up to a height of 30 ft. or more.

McCARTEE, ROBERT, D.D., 1791–1865; b. N. Y.; graduated at Columbia college, 1808; having studied law and practiced it for several years, he entered the theological seminary of the Associate Reformed church and in 1816 was licensed to preach; in 1817 installed pastor of the Old Scots' church, Philadelphia, which was greatly strengthened under his ministry; in 1822 became pastor of the Irish Presbyterian church, New York, which, under his charge, increased from 30 members to more than 1000, becoming one of the prominent churches in the denomination; in 1836, because of impaired health, he took a less laborious charge at Port Carbon, Penn., where he formed a lyceum of natural history and was a zealous promoter of education among the miners; in 1840 removed to Goshen, N.Y.; in 1849 to Newburg; 1856–62, pastor of the Twenty-fifth Street Associate church, New York city; after which, in declining health, he spent the remainder of his useful life at Yonkers, N.Y.

McCARTHY, JUSTIN, b. Cork, Ireland, 1830; entered upon the career of a journalist at the age of 16 years by joining the staff of the Cork *Examiner*, which paper he left in 1853 to connect himself with the Liverpool *Northern Times*. He entered the reporters' gallery of the house of commons in 1860 as a reporter for the *Morning Star*, of which journal he became foreign editor the next year, and editor-in-chief in 1864, in which position he remained four years. In 1868 he made a tour in the United States, where he remained three years, occupying the most of his time in travel, and visiting 35 states. Mr. McCarthy published his first novel, *Paul Messie*, anonymously in 1866; this was followed by *The Waterdale Neighbors*, 1867; *My Enemy's Daughter*, 1869; *Lady Judith*, 1871; *A Fair Saxon*, 1873; *Linley Rochford*, 1874; *Dear Lady Disdain*, 1875; *Miss Misanthrope*, 1877; *Donna Quixotte*, 1879; and *The Comet of a Season*, 1881. He also wrote numerous papers for the *Galaxy* (New York), some of which were compiled and published in a volume under the title *Modern Leaders;* and *A History of Our Own Times*

being a chronicle of the events of the reign of queen Victoria, 1877–80. In 1879 he was elected to parliament from Longford, Ireland, as a "home ruler."

McCAUL, JOHN, D.D., LL.D., b. Dublin, 1810; educated at Trinity college, Dublin, obtaining the highest honors, and appointed classical tutor and examiner; appointed in 1838 principal of the Upper Canada college; in 1842 became vice-president of King's college, and professor of the classics, logic, and rhetoric; president of the university of Toronto; in 1853 president of University college, and vice-chancellor of the university of Toronto. He has published essays on classical subjects, lectures on Homer and Virgil, and edited some of the classics, also a Canadian monthly, the *Maple Leaf*. His *Britanno-Roman Inscriptions* and *Christian Epitaphs of the First Six Centuries* are valuable works. He composed, also, some anthems and other pieces of music.

McCAW, JAMES BROWN, 1772–1846; b. Va.; studied medicine at the university of Edinburgh, and returning to Virginia became the principal surgeon in the state.

McCAW, JAMES BROWN, b. Richmond, Va., 1823; graduated at the university of New York in 1844; edited the *Virginia Medical and Surgical Journal* 12 years; was first lecturer, then professor in the Virginia medical college. During the rebellion he organized the Chimborazo hospital at Richmond, in which over 70,000 patients were treated.

McCHEYNÉ, ROBERT MURRAY, 1813–43; b. Edinburgh; entering the high school at the age of eight, he held high rank in his classes; educated at the university of Edinburgh in 1827–31, gaining prizes in various departments of studies; in 1831 commenced the study of theology with Dr. Chalmers and Dr. Welsh; was licensed to preach in 1835, and began his ministry at Larbert, a parish of 6,000 people. He was then an intense student of the Bible, reading it in Hebrew and Greek. In 1836 he was ordained and installed pastor of St. Peter's church, Dundee. After several years, his health failing, he resigned, and went to Palestine, with three others, on a "mission of inquiry to the Jews." Returning with improved health, he resumed his pastorate of St. Peter's till 1842, when, his health again failing, he made a tour through the n. of England, preaching in the open air and in churches of different denominations. Returning to Dundee, he had an assistant, and in 1843 made another tour as an evangelist. He was pre-eminent as a pastor, preacher, and Christian. His earnest and faithful labors were instrumental in the conversion of great numbers in the memorable revival of 1839. He possessed fine literary taste, and left several hymns of great beauty. In 1827 a collection of his works was published in two volumes, and several volumes of his remains, letters, and fragments have been issued. The *Narrative of a Mission of Inquiry to the Jews from the Church of Scotland*, in connection with the rev. A. A. Bonar, in two volumes, was published in 1839. His life also has been written by Mr. Bonar.

MACCHIAVELLI, NICCOLO DI BERNARDO DEI, born of an ancient but decayed family at Florence, in 1469, and a pupil of the celebrated scholar, Marcello Virgilio, was employed in public affairs from a very early age, and may be regarded as the literary representative of the political life of the important period to which he belongs. From a subordinate post in the office of the chancellor of Florence, which he held at that critical period of the republic which succeeded the expulsion of the Medici in 1493, he rose, in 1498, to the place of secretary of the "ten," which, in the Florentine constitution of that day, may be regarded as the ministry of foreign affairs. Macchiavelli s duties were almost entirely diplomatic; he was employed in a great variety of missions, the instructions and correspondence connected with which may almost be said to contain the secret political history of Italy during his time. The culminating point of Macchiavelli's reputation as a diplomatist was his mission to the great master of treachery and dissimulation, Cæsar Borgia, duke of Valentino, in 1502, of which an account is preserved in 52 letters written during the course of the negotiation, not surpassed in dramatic interest by any series of state-papers which has ever been produced. In the complicated external relations which Italy had now assumed, and which have remained with few changes to the present day, Macchiavelli is found in communication with all the great foreign powers, as he had hitherto been with the Italian principalities. In 1507 he was sent to the emperor Maximilian; and in 1510 he undertook a mission to France (the third time he had visited that country in a diplomatic capacity), which had a most important bearing on the relation of France with Italy, and the results of which will be best understood by comparing the league of Cambrai with the subsequent alliance for the expulsion of the French out of Italy. On the restoration of the Medici in 1512, Macchiavelli was involved in the downfall of his patron, the Gonfaloniere Soderini. He was arrested on a charge of conspiracy in 1513. On being put to the torture, he disclaimed all knowledge of the alleged conspiracy; but although pardoned, in virtue of the amnesty ordered by Leo X., he was obliged for several years to withdraw from public life, during which period he devoted himself to literature. It was not till the death of Lorenzo de' Medici, in 1519, that Macchiavelli began to recover favor. He was commissioned in that year, by Leo X., to draw up his report on a reform of the state of Florence; and in 1521, and the following years, he resumed his old official occupation, being employed in various diplomatic services to several of the states of Italy. On his return to Florence in May, 1527, he was taken ill, and having trusted to his own treatment of himself, the malady assumed a very formidable character, and in the end proved fatal.

on June 22, 1527, just as Macchiavelli had completed his 58th year. Some difference of opinion has existed as to his religious belief, and as to his sentiments during his last hours; but it seems certain that his death was marked by sentiments of religion, and accompanied by the ordinary ministrations of his church. His last years, however, were comparatively neglected. He was buried in the family vault in the church of Santa Croce; but it was only in 1787, and then through the munificence of a foreigner, the earl Cowper, that a monument was raised to his memory.

Macchiavelli's writings are very numerous, filling 6 vols. 4to (Florence, 1783), or 10 vols. 8vo. Besides his letters and state-papers, which, as we have seen, are of the highest interest, his historical writings also comprise *Florentine Histories*, extending from 1215 to 1492, with a fragmentary continuation to 1499; *Discourses on the First Decade of Titus Livius;* a *Life of Castruccio Castracani* (unfinished); a *History of the Affairs of Lucca*. His literary works comprise comedies, an imitation of the *Golden Ass* of Apuleius, an essay on the Italian language, and several minor compositions. He also wrote *Seven Books on the Art of War*, which has been much admired by the learned in military science. But the great source of his reputation, for good or for evil, is the celebrated book, *De Principatibus*, or, as it has since been called, *Del Principe*, some account of which is indispensable, in order to a just appreciation of the author. The main question discussed in this world-famed book is: "How principalities may be governed and maintained." In resolving this question, various cases are supposed, for each of which, appropriate rules, principles, and suggestions are laid down, and all are illustrated both by contemporary examples and by a wealth of historical learning which it is difficult to overrate. The 7th chapter, in which he details, and with evident admiration, the system of Cæsar Borgia, and the 18th, in which he discusses "the duty of princes as to the obligation of keeping faith," are perhaps those which have most contributed to draw upon the author the odious reputation of which his very name has become the symbol; but, in truth, these chapters are only more precise and more formal than the rest, from their heaping together statements which are elsewhere insinuated or supposed; the broad scheme of the book being everywhere the same, viz., that, for the establishment and maintenance of authority, all means may be resorted to; and that the worst and most treacherous acts of the ruler, however unlawful in themselves, are justified by the wickedness and treachery of the governed. Such being the moral of the book, a question has arisen as to the intention of the writer, and a favorite theory for a time prevailed that *The Prince* was but a satire upon absolutism, and was designed to serve the cause of liberty, of which Macchiavelli was an ardent friend, by making arbitrary power odious and contemptible. This theory, however, besides being utterly irreconcilable with the tone of the work, is completely disproved by a letter of Macchiavelli to his friend Vettori, 1513, which was only discovered in 1810, and which shows that *The Prince* was written by Macchiavelli in all seriousness, in order to recommend himself to the Medici (for whose private perusal it was designed, and not for publication) as a master in the art of government. In his ardor for the liberation of Italy from the rule of foreigners, Macchiavelli had become convinced that strong native governments, even though absolute, must be endured; and, having accepted that of the Medici for Florence, he was content to use all means for its security and consolidation. *The Prince* was published after Macchiavelli's death, at Rome, in 1532; and if any doubt should be entertained as to the seriousness of the author, it need only be compared with the commentary which is furnished by every page of his *Legazioni*, or the reports of his diplomatic missions, which are also contained in his collected works. Of the many criticisms and rejoinders to which *The Prince* has given occasion, the most remarkable is that of Frederick the great, *Antimacchiavelli, ou Examen du Prince de Macchiavelli*, 1740. It may be added that *The Prince* was condemned by pope Clement VIII.

McCLELLAN, George, 1796–1847; b. Conn.; educated at Yale, and graduated in medicine from the University of Pennsylvania in 1819. He was one of the founders of, and a professor in, the Jefferson medical college, Philadelphia, 1826–39; and in the Gettysburg medical college from 1839–43. He published *The Principles and Practice of Surgery*, and his rank as a surgeon was high.

McCLELLAN, George Brinton, Mag.-gen. U.S.A., was b. at Philadelphia in Dec., 1826. In his 16th year he was sent to the United States military academy at West Point, where he graduated with high honors in 1846, and joined the army as second lieut. of engineers, to take an active part in the Mexican war, where he distinguished himself under gen. Scott, in the battles of Contreras, Churubusco, Molino del Rey, and Chapultepec, and was promoted to a captaincy. At the end of the war he was appointed to a professorship at West Point, and wrote a manual on the art of war. He built fort Delaware, commenced a topographical survey for the Pacific railway, and was one of three American officers sent to observe the campaign in the Crimea. On his return to America, he resigned his commission in the army, and became technical director of the Illinois Central railway. At the commencement of the war of secession, 1861, he was appointed maj.gen. of the Ohio militia, but, by the advice of gen. Scott, he was tendered by president Lincoln the position of maj.gen. of the army. After a successful campaign in western Virginia, he was made commander-in-chief, and reorganized the army of the Potomac, defeated at Bull Run, July 21, 1861. In the summer of 1862 he

invaded Virginia, by the peninsula of James river, and advanced near to Richmond, but was defeated in a series of battles in July, and compelled to retreat, and finally to evacuate the peninsula. After the defeat of gen. Pope, in the second battle of Bull Run, Aug. 29, 1862, which was followed by a confederate invasion of Maryland, he reorganized the army at Washington, marched rapidly north, met the forces of gen. Lee at Antietam, and compelled him to recross the Potomac. He followed the confederates into Virginia, but being opposed to the policy of the extreme war-party, he was superseded by gen. Burnside. In 1864 he was the democratic candidate for the presidency. He was then in Europe till 1868, and in 1877 was elected governor of New Jersey. He has published several military papers.

McCLELLAN, George Brinton (*ante*); son of George, who was a distinguished physician, graduate of Yale college, and founder of Jefferson college. His remoter ancestors were Scotch. At West Point he gained a reputation for close application and intelligent study, rather than for brilliancy or showy talents. It was a surprise when this quiet, thoughtful, but not remarkable student graduated second in general rank in the largest class that had ever left the academy, and first in the class of engineering. In the spring of 1855 he was appointed to a captaincy in the first cavalry regiment, under col. Sumner As one of the commission sent to the Crimea, he combined in making the official report, which was published by the U. S. government, and which recommended improvements in the organization and discipline of the American army. Soon after entering the service of the Illinois Central railroad, he became vice-president of the road. In May, 1860, he married the daughter of gen. R. B. Marcy. In August of that year he resigned his position in the Illinois Central, to assume the presidency of the Ohio and Mississippi railroad, which post he held, residing in Cincinnati, until the outbreak of the rebellion. His commission of maj.gen. of volunteers bore date April 23, 1861, and he was at once appointed to organize the regiments forming in the state of Ohio. Called to the command of the armies of the United States after the disastrous affair of the first Bull Run, gen. McClellan soon discovered the potent influence which politics were destined to exercise over the progress of the conflict. Chafing under the first serious repulse of the war, the people clamored for immediate action, while to many politicians this was not desirable. Cross-purposes resulted in placing the young commander at a disadvantage; and from the period of his being placed in supreme command, to that when he was ordered to resign in favor of gen. Pope, he may be said never to have been relieved from the trammels of politics. The great success which he gained at Antietam revived the drooping hopes of the country, and it is on record that his final supersedure by gen. Burnside was against the judgment of that officer, who was presently defeated at Fredericksburg, to be succeeded in turn by gen. Hooker, who immediately went into winter cantonments. From Antietam to Gettysburg, the history of the army of the Potomac was a history of defeat and disaster. In the presidential campaign of 1864, gen. McClellan received a popular vote of 1,800,000, Mr. Lincoln receiving 2,200,000. After his return from Europe in 1868, he made his home at Orange mountain, New Jersey, and Nov. 6, 1877, was elected governor of that state, filling the chair until 1881. On his retirement from that position he assumed the office of president of a new underground railroad company organized in the city of New York. Gen. McClellan is the author of a volume of the series of government reports of the survey for the Pacific railroad; *The Armies of Europe*, 1861; *Report on the Organization and Campaigns of the Army of the Potomac;* and a number of important articles contributed to the *North American Review*, and other periodicals, including the valuable series of papers published in 1877 on the Russo-Turkish war. As a scientific and practical engineer he stands in the first rank; while even his opponents concede his abilities as a military critic and organizer, his conscientiousness and unassuming worth.

McCLERNAND, John A., b. Ky., 1812; passed his early youth at Shawneetown, Ill., on the Ohio river, 182 m. s.e. of Springfield, where his mother had removed on the death of his father in 1816. Here his time was divided between the labor of the farm and the study of the law until 1832, when he was admitted to the bar. In 1833, having served as a private in the war against Black Hawk, chief of the Sac and Fox tribes, which ended Aug. 2 of that year in the defeat of the Indians near the Wisconsin river, he resumed the practice of his profession, and engaged in mercantile pursuits. In 1835 he became the editor and publisher of *The Democrat*. In 1836 he represented his district in the state legislature, and again in 1840 and 1842. From 1843 to 1851 he was member of congress from Illinois. In 1851 he removed to Jacksonville, and in 1859 was elected congressman from the Springfield district. At the breaking out of the rebellion, having been appointed brig.gen. May 17, 1861, he raised by his personal influence, with that of cols. Logan and Fonke, the McClernand brigade, which he commanded at the battle of Belmont, on the Mississippi river, opposite Columbus, Ky., Nov. 7 of the same year, where, being greatly outnumbered, his force suffered defeat. In Feb., 1862, he gallantly led his command, on the right of the union lines, at the bombardment of fort Donelson, and was promoted in the following March to the command of a division, which he led April 6 and 7 at the battle of Shiloh, or Pittsburg Landing, against gens. A. S. Johnston and Beauregard, resulting in the death of gen. Johnston and the retreat of the confederates. On Jan. 4, 1863, he superseded gen. W. T. Sherman in the com-

mand of the forces threatening Vicksburg (the latter gen. retaining the command of his own corps, the 15th), until relieved by gen. Grant, who was placed at the head of all the forces operating against Vicksburg. On Jan. 11, his division being combined with the naval forces under admiral Porter, he commanded the expedition that finally carried by storm the garrisoned village of Arkansas Post, taking a number of prisoners and immense quantities of commissary stores. He also distinguished himself on the Big Black river, May 12, 1863, and on the morning after the battle of Champion hills, May 16, 1863, sometimes called Baker's creek. This desperate struggle lasted five hours, in which the confederates were forced back to the Big Black river, losing heavily in men and artillery, his own corps, with that of gen. McPherson's, suffering terribly in killed and wounded. The confederates, having intrenched themselves on both banks of the river, were successfully assaulted, 17 pieces of their artillery were captured, and the remnant of gen. Pemberton's army was compelled to retreat to their stronghold of Vicksburg. On Nov. 30, 1864, he resigned his commission as maj.gen. of the 13th army corps, and retired to private life.

MAC'CLESFIELD, an important manufacturing t. of Cheshire, England, is situated on the river Bollin, on the western base of a range of low hills, 15 m. s.s.e. of Manchester. It contains a fine old church, St. Michael's, founded in 1278; and a grammar school, endowed in 1502, and having an annual revenue of £1500. Within the present century Macclesfield has advanced rapidly as a seat of manufactures. Silks, embracing the finest varieties, are the principal fabrics made; cotton goods and small-wares are manufactured, and there are dye-works and breweries. In the vicinity, coal, slate, and stone are obtained. Macclesfield returns two members to the house of commons. Pop. '71, 35,570, showing a slight decrease since 1861.

McCLINTOCK, Sir FRANCIS LEOPOLD, D.C.L., LL.D., b. Ireland, 1819; entered the navy in 1831, and in 1838, having passed his examinations, he went to South America in the steamship *Gorgon*. For his services in bringing off the *Gorgon*, which ran ashore near Montevideo, he was made a lieut. in 1845. He was attached to the Pacific squadron, 1845–47, and in 1848 was a member of the Arctic expedition under sir James C. Ross for the relief of sir John Franklin. In 1850 he was first lieut. of the *Resistance* in the Arctic expedition under capt. Austin; and in April, 1851, began a sledge journey along the northern shore of Parry sound, traveling 760 m. in 80 days. On his return to England he was made a commander, and in 1852 commanded the *Intrepid*, in the Arctic expedition under sir Edward Belcher. He succeeded in rescuing McClure near Melville island, but was afterwards obliged to abandon his vessel; and only one of the five ships which had composed Belcher's expedition succeeded in reaching England. In 1857 McClintock, who in the meantime had been promoted to a captaincy, started in search of sir John Franklin, in command of the *Fox*, a screw-steamer of 177 tons, fitted out by lady Franklin. On the north-western coast of King William Land he found records of the death of sir John Franklin, and of the abandonment of the *Erebus* and *Terror*. On his return in 1859 he was knighted, and received the degree of doctor of laws from the universities of Oxford, Cambridge, and Dublin. In 1865 he was made commodore of the Jamaica station, and in 1872 vice-admiral. He published, in 1869, *Voyage of the Fox in the Arctic Seas*.

McCLINTOCK, JOHN, D.D., LL.D., 1814–70; b. Philadelphia; graduated at the university of Pennsylvania in 1835; ordained a minister of the Methodist Episcopal church, and appointed professor of mathematics in Dickinson college in 1837; in 1840 transferred to the professorship of Greek and Latin; translated, with Dr. Blumenthal, in 1847, Neander's *Life of Christ;* and, with prof. Crooks prepared a series of Greek and Latin text-books; in 1848 was elected by the general conference editor of the *Methodist Quarterly Review*, retaining the position for eight years. In 1856 he was appointed, with bishop Simpson, a delegate to the Wesleyan Methodist conference of England, and to the evangelical alliance held at Berlin. In 1857 he became pastor of St. Paul's Methodist church in New York, and in 1860 was preacher in the American chapel in Paris. When in Europe, during the war of the rebellion, he advocated with ability the union cause, in conversation, by the pen, and on the platform; and his home in Paris was a rallying center for patriotic Americans. During his absence he was corresponding editor of the *Methodist*. Returning to America in 1864, he was again, for a short time, placed in charge of St. Paul's church in New York. His health failing, he resigned in 1865, and resided in Germantown, Penn. In 1866 he removed to New Brunswick, supplying for a time St. James's church, and was made chairman of the central centenary committee of the Methodist Episcopal church. Through his influence, Daniel Drew, a member of St. Paul's church in New York, contributed a large sum to the centenary fund, which was appropriated for the founding of an institution at Madison, N. J., called the Drew theological seminary. Dr. McClintock was its president till his death. Dr. McClintock attained a high rank as a scholar, teacher, writer, and preacher, and for many years was a leader in the Methodist church. Besides the works mentioned, and numerous articles in periodicals, he published *Analysis of Watson's Theological Institutes; Sketches of Eminent Methodist Ministers; The Temporal Power of the Pope;* a translation of Bungener's *History of the Council of Trent*. In the last 20 years of his life he labored in preparing the *Cyclopædia of Biblical, Theological, and Ecclesiastical Literature*,

in connection with the rev. Dr. James Strong. At the time of Dr. McClintock's death three volumes had been published, the work being continued by Dr. Strong. Six volumes have since been issued. A volume of Dr. McClintock's sermons, entitled *Living Words*, and *Lectures on Theological Encyclopædia and Methodology*, have been published since his death.

McCLOSKEY, JOHN, D.D., Cardinal, b. Brooklyn, 1810; educated at St. Mary's college, Maryland, and ordained to the priesthood in 1834. After spending two years in Rome, he returned to New York, and became pastor of St. Joseph's church. In 1844 he was appointed coadjutor of bishop Hughes, and in 1847 was consecrated bishop of the new diocese of Albany, where he remained till 1864, when he succeeded Dr. Hughes as archbishop of New York. In 1875 Pius IX. made him a cardinal with the title of Santa Maria sopra Mineroa, and he received his cardinal's hat in Rome from Leo XIII. in 1878. He has shown himself a highly vigorous and successful administrator in all his responsible positions, and is both personally esteemed and popular as a cardinal-prince in his own communion and outside its bounds.

McCLUNG, JOHN ALEXANDER, D.D., 1804–59; b. Washington, Ky.; studied at Princeton theological seminary; was licensed to preach in the Presbyterian church in 1828; abandoned the ministry on account of doubts as to the authenticity of some books of the Bible, and commenced the study of law; admitted to the bar in 1835, and practiced with success till 1849, when he again entered the ministry; was ordained in 1851, and was pastor of the First Presbyterian church, Indianapolis, 1851–57; declined the presidency of Hanover college; was pastor at Maysville, Ky., in 1857. He was a man of brilliant intellect and solid learning.

McCLURE, ALEXANDER WILSON, D.D., 1808–65; b. Boston; educated at Yale and Amherst colleges and Andover theological seminary; settled pastor of the Congregational church at Malden, Mass., 1830–41; resided at St. Augustine, Fla., 1841–44; editor of the *Christian Observatory*, 1844–47; pastor again at Malden, 1848–52; pastor of the First Reformed church, Jersey City, 1852–55, and then became cor.sec. of the Am. and For. Christian union. His health having failed, he was sent in 1856 as chaplain of the Christian union to Rome, Italy. In 1858 he retired from public life, and was a great sufferer from disease until his death. The American chapel in Paris was erected with funds obtained by Dr. McClure. His contributions were numerous for the *Christian Observatory*, the *New Brunswick Review*, and *Literary and Theological Review*. He published also *Lives of the Chief Fathers of New England;* the *Bi-Centennial Book of Malden;* *The Translators' Revival*, besides several controversial religious treatises. He was a man of wit and learning and a skillful polemic, defending the old in theology and in ecclesiastical procedure.

McCLURE, Sir ROBERT JOHN LE MESURIER. See MACLURE, *ante*.

McCLURG, JAMES, 1747–1825; b. Va.; educated at William and Mary college and at the university of Edinburgh, where he took his medical degree in 1770. In London, where he continued his studies, he published an *Essay on the Human Bile*, which attracted much attention. On his return to Virginia he practiced his profession first at Williamsburg, and afterwards at Richmond, and stood at the head of the profession in the state. He was a member of the convention that framed the U. S. constitution.

McCOOK, a co. in s.e. Dakotah, formed since the census of 1870; watered by the Vermilion river; 432 sq.m. The soil is fertile and the surface mostly prairie land.

McCOOK, ALEXANDER McDOWELL, b. Columbiana co., Ohio, 1831; graduated at West Point, and entered the army in 1852 as brevet second lieut. of infantry. He was employed for a time in garrison duty, afterwards in Indian warfare, and in 1858 was appointed instructor in infantry tactics at West Point. On the outbreak of the rebellion he was appointed col. of the 1st Ohio volunteers, which he led in the first battle of Bull Run. In 1861 he was made brig.gen. of volunteers and assigned to a command in the army of the Cumberland. He commanded a division in the battle of Shiloh and the siege of Corinth; led the 1st army corps in the battle of Perryville, the 20th army corps at Stone river and Chickamauga, and the troops for the defense of Washington against Early in 1864. He was brevetted maj.gen. of the regular army, but having resigned his commission in 1865, was promoted in 1867 to be lieut.col. of infantry. His father and seven of his brothers served in the war, and the father and three of his sons were killed. Four of the eight brothers attained the rank of general.

McCOOK, EDWARD M., b. Steubenville, Ohio, 1834; received only a common-school education; accompanied governor Medary to Minnesota as his private secretary in 1856; in 1859 went to Pike's Peak, and in 1860 was a member of the Kansas legislature; enlisted in the war for the union, and led various successful cavalry raids in the Atlanta and other campaigns, attaining the rank of brig.gen. in 1864, and brevet maj.gen. in 1865. He was minister to the Sandwich islands from 1866 to 1869, and afterwards for six or seven years governor of Colorado.

MACCORD, LOUISA S. (CHEVES), daughter of Langdon Cheves, b. Columbia, S.C., 1810; was married in 1840 to David J. Maccord; in 1848 translated Bastiat's *Sophisms of*

the Protective Policy; in the same year published a volume of poems, *My Dreams;* and in 1851 *Caius Gracchus*, a tragedy. She wrote extensively for *De Bow's Review* and the *Southern Literary Messenger*, and during the rebellion rendered valuable service in the confederate hospitals.

McCORMICK, CYRUS HALL, b. Va., 1809; removed to Cincinnati in 1845, and to Chicago in 1847. In 1816 his father invented a machine intended to supersede the sickle and scythe in the harvest field; and the son, having had his thoughts thus early directed to the object, in 1831 produced and afterwards patented the reaping machine which, subsequently greatly improved by him, has become celebrated in different lands, and has won for its inventor many gold medals and other distinctions, as well as great wealth. In 1859 with a portion of his wealth he contributed largely to the establishment at Chicago of the Presbyterian theological seminary of the north-west; and has since endowed a professor's chair in Washington and Lee college, Lexington, Va., besides presenting to the institution a telescope, ordered from Alvan Clark on the stipulated condition that the object glass should be equal in size and finish to that of the similar instrument furnished by the same maker for the naval observatory at Washington, D. C. Mr. McCormick is a zealous upholder of the strict form of Calvinistic doctrine.

McCORMICK, RICHARD, C., Jr., b. N. Y., 1832; having received a classical and practical education, in 1850 he turned his attention to commercial pursuits in Wall street, New York. On his return from a tour through Europe and Asia Minor, he published a *Visit to the Camp before Sebastopol* (1855); *St. Paul to St. Sophia*, etc. From 1857 to '61 he was trustee of the New York public schools, became a journalist in 1859, and editor of the *Young Men's Magazine*. During the war of the rebellion he represented several New York journals as special correspondent. In 1862 he was appointed chief clerk of the department of agriculture, in 1863 secretary of Arizona, in 1866 governor of that territory, and was elected delegate to congress from Arizona for 6 years, 1869–75. At present, although residing in New York city, he is active in forwarding the mining interests of Arizona, and is president of the Freeland mine in Colorado. On Dec. 17, 1877, he was appointed U. S. commissioner-general to the Paris exposition, where his judicious conduct of affairs did full justice to the U. S. exhibits, and reflected credit on his administrative qualities. On Mar. 3, 1877, he had been made assistant secretary of the U. S. treasury, became one of the national republican committee on July 2 of the same year, and retired from the treasury department Sept. 15, 1877, on account of failing health.

McCOSH, JAMES, D.D., LL.D., b. in Ayrshire, Scotland, 1811; educated at the universities of Glasgow and Edinburgh; while at the latter he wrote an essay on the philosophy of the Stoics for which, on motion of sir William Hamilton, the honorary degree of A.M. was conferred on him; in 1835 was ordained a minister of the church of Scotland at Arbroath; in 1839 became pastor at Brechin, where he was active in the movement which, in 1843, resulted in the organization of the Free church; where also he published in 1850 his book on the *Methods of the Divine Government, Physical and Moral*, which laid the foundation of his fame as a philosophical writer. In 1851 was chosen professor of logic and metaphysics in Queen's college, Belfast, where he was distinguished as a lecturer; wrote in 1856, jointly with prof. George Dickie, M.D., *Typical Forms and Special Ends in Creation;* published, in 1866, *Intuitions of the Mind Inductively Investigated, being a Defense of Fundamental Truth;* in 1862, *The Supernatural in Relation to the Natural;* and in 1866, *An Examination of Mill's Philosophy*. In 1868, having been elected president of the college of New Jersey, he became a resident of Princeton, where he has, by his successful administration and wide reputation, contributed greatly to the remarkable prosperity which the institution now enjoys (see NEW JERSEY, COLLEGE OF). He has published *The Laws of Discursive Thought and a Treatise on Logic* (1869); *Christianity and Positivism*, a series of lectures delivered on the Ely foundation at the Union theological seminary in New York (1871); *The Scottish Philosophy, Biographical, Expository, and Critical, from Hutcheson to Hamilton* (1874); *A Reply to Professor Tyndall's Belfast Address* (1875); besides frequent contributions to the *Princeton Review* and other periodicals in this country and Great Britain. With a keen discriminative intellect he combines a broad mental scope; he has abundant philosophical learning, and holds stoutly to the ancient doctrinal system of his church in a spirit not averse to liberty and modern light. This liberality makes him an efficient critic of speculations that are put forth as facts.

McCOSKRY, SAMUEL ALLEN, D.D., D.C.L., b. Carlisle, Penn., 1804; was a cadet at West Point for one year; graduated at Dickinson college, and became a successful lawyer, but left that profession to become a minister of the Episcopal church. He was a rector first in Reading, Penn., then in Philadelphia, and consecrated bishop of Michigan in 1836. In 1878 he was deposed upon charges affecting his moral character.

McCRACKEN, a co. in w. Kentucky, bounded by the Tennessee and Ohio rivers, and traversed by the Clark river and the Paducah and Memphis railroad; 232 sq. m.; pop. '80, 16,260. It has a level surface and fertile soil, the productions being Irish and sweet potatoes, butter, tobacco, Indian corn, and wheat. There are manufactures of agricultural implements, carriages and wagons, tobacco, etc.

McCREA, JANE, 1754–77, b. N. J.; after the death of her father, a Scotch Presbyterian clergyman, she lived near fort Edward with her brother, who, on the arrival of Burgoyne in 1777, wishing to take her to some more protected place, sent for her to the house of a Mrs. McNeil at Fort Edward. His sister was engaged to David Jones, a tory and an officer in a loyalist regiment. In the hope of meeting him, whom she believed to be with Burgoyne's army, she put off her departure for some time, till, on the day it was to take place, the McNeil house was surrounded by Indians, and its inmates taken to Burgoyne's camp. Mrs. McNeil arrived there in safety, but a fresh party of Indians soon brought in the scalp of Miss McCrea. The manner of her death, which was the subject of a sharp correspondence between Burgoyne and Gates, is not known. The Indians pretended that she was killed by a stray shot from the Americans; and according to another story she was tomahawked in a dispute among the Indians as to whom she belonged. A later legend affirmed that the Indians had been employed by Jones to bring her to the British camp, and that they had murdered her in a quarrel as to the reward promised.

M'CRIE, Dr. THOMAS, a Scottish divine and historian, was b. at Dunse, in Berwickshire, Nov., 1772; studied at the university of Edinburgh, and was ordained, in 1795, pastor of an anti-Burgher congregation in that city. Here he died, Aug. 5, 1835. M'Crie's works are in the highest degree valuable to the student of Scottish ecclesiastical history. They exhibit a vast amount of minute yet important research, and though they are essentially apologetic, the author is never consciously unfair, and does not misstate facts. He has, however, a way of palliating even the indefensible acts of the reformers, and a zeal for Presbyterianism that caused the impartial Hallam to describe his spirit as *Presbyterian Hildebrandism*. M'Crie's best known works are *The Life of John Knox* (Edin. 1812; new ed. 1855–57) and *The Life of Andrew Melville* (1819).

McCULLOCH, a co. in w. Texas, having the Colorado river as its n. boundary; 915 sq.m.; pop. '80, 1533. Stock-raising is followed by the inhabitants more than agriculture, though the bottom-lands along the Colorado are fertile.

McCULLOCH, BEN, 1814–62, b. Tenn.; took part in the struggle for Texan independence, and distinguished himself in the Mexican war. In 1853 he was made a U. S. marshal, and in 1857 commissioner of Utah. He was a brig.gen. in the confederate service during the civil war, and commanded in several engagements in Missouri. He was killed at the battle of Pea Ridge.

M'CULLOCH, HORATIO, a Scottish landscape-painter, was b. in Glasgow in 1806, and named after lord Nelson. His first intention was to fit himself for being a manufacturer, but finally he devoted himself entirely to art. He exhibited for the first time in 1829. In 1836 he was elected an associate of the Scottish academy, and next year he fixed his residence at Hamilton, and made enthusiastic studies of the oaks in Cadzow Forest. Two years afterwards, when he was elected a member of the Royal Scottish academy, he removed to Edinburgh, where he lived till his death in 1867. M'Culloch headed the roll of the contemporary Scottish landscape-painters. He painted the Highlands with unrivaled truth, breadth, and imagination. Among his principal pictures are "Highland Loch," "Loch-an-Eilan," "View in Cadzow Forest," "Dream of the Forest," "Misty Corries," "Deer Forest, Isle of Skye," "Loch Achray," "Mist Rising off the Mountains," "Kilchurn Castle, Loch Awe," and "Bothwell Castle, on the Clyde."

McCULLOCH, HUGH, b. Me., 1811; studied at Bowdoin college, but on account of ill health did not graduate; in 1833 he removed to Fort Wayne, Ind., and entered upon the practice of law. In 1855 he was made president of the Indiana state bank, where he had been employed since 1835, which position he held for eight years, gaining a more than local reputation as a skilled financier. In 1863 secretary Chase, of the treasury, called him to Washington to take charge of the newly created bureau of the currency, and appointed him comptroller of that department. In Mar., 1865, McCulloch succeeded Fessenden as secretary of the treasury at the request of president Lincoln, and held that position until Mar., 1869. The derangement of the finances occasioned by the rebellion and by the very large issue of legal-tender notes and national bonds gave rise to many difficult questions to be decided by the head of the treasury department. Mr. McCulloch was an earnest advocate of specie resumption at the earliest possible moment, and a firm friend of the national-bank system as uniform and safe. For the greater part of his term of office he was in opposition to congress on the subject of retiring the legal-tender notes, arguing that the "best way to resume is to resume." The fear of contraction was very great, and it was thought that business interests would suffer from haste in the matter. Though McCulloch has since acknowledged that in some details of his scheme he was mistaken, the general principles he advocated have been proved correct by subsequent events. In 1869 he retired from the treasury, became a member of the firm of Jay Cooke, McCulloch & Co., London, and has since been engaged in banking in that city.

MACCULLOCH, JOHN, a geologist and physician, b. in Guernsey, of a Scottish family, Oct. 6, 1773. He studied and took the degree of doctor of medicine in Edinburgh, and was appointed assistant-surgeon to an artillery regiment. In 1811 he was employed by the government in geographical and scientific researches in Scotland. In 1820 he was

appointed physician to prince Leopold, of Saxe-Coburg, now king of the Belgians; and in the latter years of his life was professor of chemistry and geology in the East India company's military school at Addiscombe. He died at Penzance, Cornwall, Aug. 21, 1835, in consequence of an amputation rendered necessary by an accident. His most important works are a *Description of the Western Islands of Scotland* (3 vols., Lond. and Edinb. 1819); *A Geological Classification of Rocks, with Descriptive Synopses* (Lond. 1821); *A System of Geology, with a Theory of the Earth* (Lond. 1831); *Malaria—an Essay on the Production and Propagation of this Poison* (Lond. 1827); and *An Essay on the Remittent and Intermittent Diseases* (2 vols., Lond. 1828).

M'CULLOCH, JOHN RAMSAY, b. at Isle of Whithorn, Wigtonshire, in 1789, a distinguished political writer, and the foremost among our political economists, first became known in connection with the *Scotsman* newspaper and the *Edinburgh Review*. He came forward as a contributor to the former soon after its establishment in 1817; and for a considerable time was its editor. He made his *début* in the latter in 1818, by contributing to it an article on Ricardo's *Principles of Political Economy*, and continued for about 20 years to write pretty regularly for the *Review*, having contributed almost all the economical articles that appeared in it during that period, with a few on other subjects. M'Culloch, however, is best known by his numerous works published in the course of his life, which are remarkable for the scientific spirit in which they are written, their practical good sense, and the clearness and directness of their style. By these he has done more to establish and popularize the doctrines of political economy than perhaps any other writer. His principal publications comprise: *A Discourse on the Rise, Progress, Peculiar Objects, and Importance of Political Economy; The Principles of Political Economy, with some Inquiries respecting their Application, etc.; The Literature of Political Economy, etc.; Treatises and Essays on Money, Exchange, Interest, the Letting of Land, Absenteeism, etc.; A Treatise on the Succession to Property vacant by Death, including Inquiries into the Influence of Primogeniture, Entails, etc.; A Treatise on the Circumstances which determine the Rate of Wages and the Condition of the Laboring Classes; A Dictionary, Practical, Theoretical, and Historical, of Commerce and Commercial Navigation; Statistical Account of the British Empire; Geographical Dictionary; A Treatise on Taxation and the Funding System, etc.* Most of these works have gone through several editions. A third edition of the work on taxation, which appeared in 1863, was the last work of the author, and was nearly re-written. M'Culloch also published various occasional tracts and notices, some of which had a very wide circulation. His edition of the *Wealth of Nations*, with an introductory discourse and notes, and his collected edition of the works of Ricardo, deserve to be ranked among the most important services which he rendered to his favorite science. Towards the close of his life he edited two volumes of scarce economical tracts for the political economy club, and four volumes of the same class of tracts for lord Overstone. In 1828 M'Culloch was chosen professor of political economy in University college, London; but having resigned that chair, he was subsequently (1838) appointed comptroller of her majesty's stationery office, a situation which he held till his death, and in which he is understood to have effected various important reforms. M'Culloch was a foreign associate of the institute of France; and he enjoyed a pension of £200 a year, conferred upon him by the late sir Robert Peel. He died Nov., 1864.

McCURDY, CHARLES JOHNSON, LL.D., b. Conn., 1797; educated at Yale, and called to the bar, where he took a high position. He was several times chosen to the legislature, of which he was speaker for three years. In the years 1845 and 1846 he was lieutenant-governor of the state. He was appointed by Mr. Fillmore minister to Austria in 1851; and from 1856 to 1867 he was an associate justice, first of the superior, and afterwards of the supreme court of Connecticut.

McDONALD, a co. in s.w. Missouri, having Arkansas on the s., and Indian territory on the w.; 475 sq.m.; pop. '80, 7,816. It is a fertile region, the surface undulating; productions, wheat, Indian corn, oats, Irish and sweet potatoes, cotton, tobacco, and butter. Co. seat, Pineville.

McDONALD, CHARLES J., 1793–1860; b. S. C.; settled in Georgia, where he was admitted to the bar. He was a judge of the state circuit court in 1825, a member of the state senate in 1837, and governor 1839–43. From 1857 till his death he was an associate justice of the state supreme court.

MACDONALD, ETIENNE JACQUES JOSEPH ALEXANDRE, duke of Taranto, marshal and peer of France, was b. Nov. 17, 1765, at Sancerre, in the department of Cher. He was descended from a Scotch family which followed James II. to France. Macdonald embraced the cause of the revolution, entered the army as a lieut., and rapidly rose to high military rank. In 1798 he was intrusted with the government of the Roman states, but was compelled to evacuate them by the superior force of the enemy. In 1799 he defeated the Austrians at Modena, and was defeated on the Trebbia by a superior Austrian and Russian force under Suwarrow. As commandant of Versailles, he rendered very important service to Bonaparte in the revolution of 18th Brumaire; and in 1800 and 1801 he chased the Austrians from Switzerland and the Tyrol; but after honorably filling some important political posts, he lost the favor of Bonaparte by his honest support of the cause of Moreau. In 1809 he was summoned by the emperor to

take the command of the right wing of the army of Italy under Eugène Beauharnais, and took Laibach. He greatly distinguished himself at the battle of Wagram, and on the field of battle became reconciled to Napoleon, who, for his services on that day, created him marshal and duke. He held a command in Spain in 1810, afterwards in the Russian campaign; in 1813 he defeated the Prussians at Museburg, and contributed to the success of the battles of Lutzen and Bautzen, but was subsequently defeated by Blücher at the Katzbach. After the battle of Leipzig he was employed in covering the retreat of the French army, and saved himself only by swimming the Elster. In the subsequent struggles on French ground between the Marne and Seine, Macdonald made desperate efforts; but when he saw that further resistance was hopeless, he advised the emperor to abdicate. The Bourbons made him a peer, and gave him the command of a military division; and on Napoleon's return from Elba, it fell to his lot to oppose his progress to Paris. All his troops went over to Napoleon, but he himself accompanied Louis XVIII. in his flight; and although he returned to France, he refused to serve during the hundred days. After the second restoration he was continually loaded with honors of every kind, but consistently maintained, in the chamber of peers, the principles of constitutional liberty. He died at his seat of Courcelles, near Guise, Sept. 24, 1840.

MACDONALD, FLORA, a Scottish heroine, 1720–90; b. in the island of South Uist, one of the Hebrides. When the pretender, Charles Edward Stuart, after the battle of Culloden, in 1746, fled and was pursued by the king's troops, he was rescued by the exertions of Flora, and conducted by her disguised as her female servant to the isle of Skye. They were assisted by lady Macdonald, who committed them to the care of Macdonald of Kingsburgh. A reward of £30,000 was offered for the prince. When the act of Flora became known she was arrested, and, after being kept five months on various vessels of war, she was sent to London, but soon discharged under the indemnity act of 1747. In 1750 she returned to Scotland, and was married to Allan Macdonald of Kingsburgh. They emigrated to America in 1774, and settled in Fayetteville, N. C. In the revolutionary war Macdonald took the part of the British, and served in the army. Flora returned to Europe alone, but was soon joined by her husband. Her four sons entered the British army.

MACDONALD, GEORGE, b Huntley, Scotland, 1824; educated at King's college and Aberdeen university, and studied for the ministry at the Independent college in Highbury, London. He was for some years a Congregational minister, but, quitting the ministry, he removed to London and devoted himself to authorship, in which he has attained a high position as a novelist and poet. In 1872–73 he visited the United States, chiefly on a lecturing tour, but preaching in a few pulpits. His first book, *Within and Without*, a dramatic poem, appeared in 1856, and among his later publications are: *David Elginbrod*, 1862; *Annals of a Quiet Neighborhood*, 1866; *Robert Falconer*, 1868; *Wilfrid Cumbermede*, 1871; *Malcolm*, 1874; *The Marquis of Lossie*, 1877; *Sir Gibbie*, 1879; and *Mary Marston*, 1881. He has written also on theological subjects, and his novels have much theology and practical religion. His thought is original and vigorous, while he is master of a clear and elegant style.

MACDONALD, Sir JOHN ALEXANDER, D.C.L., b. Canada, 1815; was called to the bar in 1835, and was returned to parliament in 1844 as conservative member for Kingston, which city he has continued to represent. In 1847 he became a member of the executive council and receiver-general, and later in the same year commissioner of crown lands. He was in opposition 1850–54, and in the latter year entered a coalition cabinet as attorney-general, holding office till 1862, when the ministry, upon the defeat of their militia bill, resigned. In 1864 he entered the cabinet of sir E. P. Tache as attorney-general. A coalition was now formed between the leaders of the government and the opposition on the bill to unite all British America under a federal government. In 1865 sir John became minister of militia; in 1868, minister of justice and attorney-general; and in 1869 premier in the Dominion cabinet, going out of office in 1873. He formed another cabinet in 1878, taking himself the post of minister of the interior.

McDONNELL, Sir RICHARD GRAVES, LL.D., b. Ireland, 1815; educated at Trinity college, Dublin, and called to the Irish and afterwards to the English bar. He was made chief-justice of the Gambia district, Africa, in 1843, and governor of the British settlements on the Gambia in 1847. In the latter capacity he conquered a number of hostile native tribes, and explored a considerable portion of Africa from the Gambia to the Senegal. In 1852 he became governor of St. Vincent, and in 1855 governor-in-chief of South Australia. He was appointed lieut.gov. of Nova Scotia in 1864, and was governor of Hong-Kong, 1865–72.

McDONOUGH, a w. co. in Illinois; 576 sq.m.; pop. '80, 27,985. The surface presents an undulating appearance, and is chiefly fertile prairie land. It is drained by Crooked creek, and intersected by the Chicago, Burlington and Quincy, and the Toledo, Peoria and Warsaw railroads. The productions are wheat, rye, Indian corn, oats, wool, butter, and potatoes. There are a large number of flour and saw mills, and manufactories of carriages and saddlery and harness. Co. seat, Macomb.

McDONOUGH, THOMAS, 1783–1825; b. Del.; became a midshipman in 1800, and three years later was on the frigate *Philadelphia* in Preble's expedition against Tripoli; he was also attached to the schooner *Enterprise* under Decatur, and was one of the party which recaptured the *Philadelphia* from the Tripolitans in 1804. He was made a lieut. in 1807, and a master-commandant in 1813. On lake Champlain, in 1814, he defeated the English fleet under commodore Downie. At the time of his death he commanded the Mediterranean fleet.

McDOUGAL, DAVID D., b. Ohio, 1809; entered the navy, 1828; made lieut. in 1841, and commander in 1857. While in command of the *Wyoming* in 1863, he fought off the coast of Japan (with six Japanese batteries firing on him) three ships of the Japanese navy, and succeeded in defeating them. He was made commodore in 1869, and was retired in 1871.

McDOUGALL, ALEXANDER, 1731–86; b. Scotland; a printer, and in 1770 sentenced to imprisonment for libeling the provincial government of New York, where his father had settled in 1755. He served through the revolutionary war with distinction, became a maj.gen., and took an active part in the battles of Germantown and White Plains. From 1778 to 1780 he was in command of the forts along the Hudson, and in 1781 was elected to congress.

McDOUGALL, JAMES A., 1817–67; b. N. Y.; began the practice of law in Illinois in 1837, and was state attorney-general in 1842 and 1844; settled in San Francisco in 1849, and the next year was elected attorney-general of California. He was a democratic member of congress, 1853–55, and U. S. senator, 1861–67; in the latter body acting as chairman of the Pacific railroad committee, and belonging to that section of the democratic party known as "war democrats."

McDOWELL, a co. in w. North Carolina, bounded on the w. by the Black mountains; 550 sq.m.; pop. '80, 9,836. The valleys are fertile, and produce wheat, rye, Indian corn, oats, Irish and sweet potatoes, wool, and butter. Co. seat, Marion.

McDOWELL, the extreme s. co. of West Virginia, on the border line of Virginia, watered by a fork of the Sandy river; 900 sq.m.; pop. '80, 3,074. It is mountainous in the s. and e. parts. The productions are: Indian corn, oats, Irish and sweet potatoes, tobacco, butter, and wool. Co. seat, Perrysville.

McDOWELL, EPHRAIM, 1771–1830; b. in Rockbridge co., Va.; attended medical lectures in Edinburgh in 1793–94; settled in Danville, Ky., in 1795, and became the leading practical surgeon in several states. He performed the first operation recorded in this country in ovarian surgery at Danville, in Dec., 1809. A report of this and of other cases, from the pen of the operator himself, appeared in the *Eclectic Repertory and Analytic Review* in 1816. He was skillful in every branch of the surgical art, having cut no less than 32 times for stone in the bladder without losing a single case.

McDOWELL, IRWIN, b. Columbus, Ohio, 1818; was educated partly at a French military school, and afterwards at the military academy of West Point, where he graduated in 1838, remaining there until 1845, in the service of the government. He served in the war with Mexico, and was brevetted a capt. for good conduct at the battle of Buena Vista. After the close of the war he acted as assistant adjt.gen., being assigned to duty in various departments until 1858, when he occupied a year's leave of absence in visiting Europe. In 1861 he was in Washington, and at the outbreak of the rebellion was employed in organizing the volunteer troops. He was commissioned brig.gen. U. S. army, May 14, 1861, and on May 27 was appointed to the command of the army of the Potomac, of which army he was the head during the disastrous defeat at Bull Run, July 21. On being superseded in this command, he was placed in charge of the defenses of Washington, but Mar. 14, 1862, was commissioned a maj.gen. of volunteers, and given a corps command in the army of the Potomac. He served in northern Virginia, and at the second defeat of Bull Run. During the last year of the war he was employed on court-martial duty, and in command of the department of the Pacific. In 1865 he received his brevet of maj.gen. in the U. S. army, and the following year was mustered out of the volunteer service. He has since been commissioned maj.gen. U. S. army, and has commanded the departments of the east, the south, and the Pacific, being still (1881) in the latter command.

McDUFFIE, an e. co. in Georgia, having the Little river for its n. boundary, and intersected by the Georgia railroad; 350 sq.m.; pop. '80, 9,449. The surface is varied, generally heavily timbered, and the soil is fertile. Co. seat, Thomson.

McDUFFIE, GEORGE, 1788–1851; b. Ga.; graduated at South Carolina college, entered the bar in 1814, and was chosen a member of the South Carolina legislature in 1818. In a duel arising out of a political dispute he received a wound, from the effects of which he never fully recovered. From 1821 to 1834 he was a member of congress, where he opposed internal improvements and the protective tariff, and in his capacity as chairman of the ways and means committee, defended the U. S. bank. In his earlier public career he had been an advocate of a centralized government; but in congress, following the general sentiment of his state, he advocated states rights, and was one of the ablest defenders of the right of nullification during the controversy between the federal gov-

ernment and South Carolina, which had its immediate cause in the hostility of the latter to a high protective tariff, and was carried on from 1820 to 1832. In 1835, having resigned his seat in congress, he was elected governor of South Carolina; and he was a U. S. senator from 1843 to 1846, when ill-health compelled him to resign.

MACE, the aril (q.v.) of the nutmeg (q.v.). In the fruit it is situated within the fleshy part, and envelops the nut. It is a lacerated membrane, blood-red, and somewhat fleshy when fresh. It is prepared for the market by drying for some days in the sun, and flatteuing. It has a peculiar, strong, agreeable smell and taste, and contains a clear, yellow, volatile oil, and a red, buttery, fixed oil. The volatile oil is obtained from it by distillation. The buttery oil, obtained by expression, mixed with the volatile oil and other substances, is known as nutmeg balsam. Mace is used as a spice, and has much of the flavor of the nutmeg. It is of a bright orange-yellow color, and has a peculiar wax-like texture. It is imported chiefly from Penang and Singapore, where it is received from the Spice islands. Small quantities are sent also from the West Indies, where its cultivation receives some attention. There used to be about 120,000 lbs. annually imported into Britain, of which 90,000 lbs. were re-exported; but the import seems to be on the decline, less than 30,000 lbs. having been received in a year. The aril of species of *myristica*, different from the true nutmeg, and coarse and very inferior, sometimes appears in commerce as mace.

MACE, a strong short wooden staff, with a spiked metal ball for a head. It was a favorite weapon with knights, with the cavalry immediately succeeding them, and at all times with fighting priests, whom a canon of the church forbade to wield the sword. No armor could resist a well-delivered blow from the mace. The mace is now borne before magistrates as an ensign of authority.

MACÉ, JEAN, b. Paris, 1815; of a working family, but given a solid education. At 20 he was a teacher of history in the college Stanislas. When the revolution of 1848 brought the republic, he supported the new government with enthusiasm, as one of the editors of *La Republique*. On Napoleon's *coup d'état*, in 1851, he was obliged to leave Paris, and became teacher of natural sciences and literature in a seminary for girls in Alsace. Here he conceived the happy plan of popularizing scientific studies for children, and began by the publication of the *History of a Mouthful of Bread*, or letters to a little girl, explaining, with the interest of a story, the laws of physiology pertaining to digestion. This plan was continued in a series of books published in France which have had a great popularity. In 1863 he joined Hetzel in the conduct of the *Magazin d'Education et de Récréation*. In 1866 he had organized a teachers' league of 30,000 members, which promoted popular education not only through schools, but also through the formation of communal libraries, and by its pressure in favor of free and obligatory education. We translate a few of the titles of Macé's admirable books for children: *Stories of the Little Château; Theater of the Little Château; History of Two Apple Merchants; Servants of the Stomach*—a sequel to the *History of a Mouthful of Bread; The Eye; Letter of a Peasant of Alsace to a Senator; The Separation of the School and the Church;* and *Half Instruction*. The last two works are intended to lay out the work of the teachers' league (*ligue de l'enseignment*) of which Macé is president.

MACEDO'NIA, anciently, the name of a country lying n. of Thessaly. It was originally of small extent, embracing only the district called Emathia, but gradually extended until, in the time of Philip, father of Alexander, it reached, on the n., the Scardian mountains, a portion of the Hæmus (mod. Balkan) range; on the w., the frontiers of Epirus and Illyria; on the e., the river Nestos (mod. Karasu); and on the s., Thessaly. The country is on the whole mountainous, especially in the s. and w., but there are several large plains of great fertility. The principal rivers were called the Strymon, the Axius, and the Haliacmon. Macedonia was famous among the ancients for its gold and silver mines, and its productiveness in oil and wine. It contained a number of flourishing cities, of which the names are well known in ancient history, particularly Pella, the capital, Pydna, Thessalonica, Potidæa, Olynthos, Philippi, and Amphipolis. The Macedonians are believed by some to have been originally an Illyrian race, but this is not probable. Their language, though different from, was yet allied to that of Greece. The singular fact, however, that it employed words not used by the Greeks, but preserved in Latin, would lead us to infer that the ethnological connection between Greece proper and Macedon belonged to an extremely remote period. The Macedonians were certainly not pure *Hellenes*, nor did the ancients so consider them; but we may regard them as ruder members of the Grecian nation, whose early development had been hindered by unknown obstacles. The history of Macedonia is involved in much obscurity till about 490 B.C., when the Persians subdued it, so that the Macedonian king, Alexander I., was compelled to take part with Xerxes in his invasion of Greece. On the retreat of the Persians after the battle of Platæa in 479 B.C., Macedonia again recovered its independence. Under the wise and vigorous reign of Archelaus, who died 399 B.C., it greatly increased in prosperity and power; but after his death, a period of civil wars and contests for the throne ensued, which ended in the accession of Philip II. (359 B.C.), who not only seated himself firmly on the throne, but knew how to develop the resources of his kingdom, and so to direct the warlike spirit of his subjects as greatly to extend his dominions. His son, Alexander III., surnamed Alexander the great (q.v.), brought

half the then known world under his empire; but after his death the Macedonian empire was broken up, and at the end of a period of 22 years of incessant wars, formed into four principal kingdoms under his greatest generals. Macedonia itself fell to the lot of Antipater, after whose death ensued another period of civil wars and contests for the throne, of which the Greeks endeavored to take advantage for the recovery of their ancient independence. But the Athenians having called in the assistance of the Romans against Philip V. of Macedonia, by whom their city was besieged, the Macedonians were defeated by the Romans in the great battle of Cynocephalæ (197 B.C.), and both Greece and Macedonia became subject to the Roman power. Perseus, the successor of Philip, was finally defeated at Pydna (168 B.C.), and adorned the triumph of Æmilius Paulus. An attempt of the Macedonian nobles to shake off the oppressive yoke of the Romans having been also defeated, and the nobles driven into exile, Macedonia became (148 B.C.) a Roman province, in which Thessaly and part of Illyria were included. After the time of Constantine, the country was ravaged by Slavic tribes; by the 7th c., the old semi-Greek Macedonians were extinct; and in the later ages of the Byzantine empire, their place was supplied by colonies from Asia, many of them of Turkish descent.—See Finlay's *Mediæval Greece*.

MACEDONIANS, a party which arose toward the close of the Arian controversy, and took their name from Macedonius, who became patriarch of Constantinople in 341. Their distinctive doctrine was the denial of the divinity of the Holy Ghost. In the early stage of the Arian question, the subject of the Holy Ghost attracted no special notice, being equivalently involved in the great subject of dispute regarding the Son. But when it came to be discussed, the same division of opinions was elicited regarding the Holy Ghost which had already arisen about the second person of the Trinity. Macedonius taught that the Holy Ghost was "subordinate to the Father and to the Son, alike to them in substance, and a creature."—Socrates, *Eccl. Hist.* ii. 46. He had himself been a member of the semi-Arian party, and as such had been deposed by the Arians in 360. His party was a considerable one, no fewer than 36 bishops having appeared attached to it at the council of Constantinople in 381. His doctrine, nevertheless, was condemned in that council, in which also was added to the Nicene creed the special clause by which the divinity of the Holy Ghost is defined. The Macedonians subsisted as a distinct party so late as the time of Theodosius.—They are also called *Pneumatomachi*, or "Adversaries of the Spirit."

MACEDO'NIUS, Patriarch of Constantinople (A.D. 341). See MACEDONIANS, *ante*.

MACEDO'NIUS was nominated bishop of Constantinople by the emperor Anastasius I., about 496 A.D. Because he had subscribed the henoticon, or "decree of union," which the emperor Zeno had issued in 482, the monks of the capital renounced fellowship with him and persistently rejected his advances towards reconciliation. Yet, in accordance with his general mildness, he abstained from treating them severely. About 511, having, by his recognition of the council of Chalcedon, incurred the displeasure of the emperor, he was deposed and banished by him on a charge of heresy and crime. The church in all parts of the empire pronounced this sentence unjust, and Vitalian the Goth, in 514, rose up in arms against it, but without success. Two years afterwards Macedonius was released from exile by death.

MACEI'O, or MACAY'O, a city in the province of Alagôas, in Brazil; pop. 8,000. It has 3 churches and as many schools. The inhabitants are agriculturists, and there is a considerable manufacture of rum. At its port, Jagnará, there is some ship-building, and sugar and cotton are exported.

McENTEE, JERVIS, b. Rondout, N. Y., 1828; devoted himself to the study of landscape painting with F. E. Church; and, in 1858, opened a studio in New York, where he soon obtained a high position among American artists. His principal success was gained in depicting mountain scenery, and by his skill in the treatment of foliage. His style is refined, his brush being handled with delicacy, though vigorously, and he is specially notable for luminous effects. In recent years he has undertaken figure-painting, and has given evidences of ability in this direction, apparently equal to that which has been conceded to him as a landscape artist.

MACERA'TA, a province in e. Italy, in the marches on the Adriatic coast; 1057 sq. m.; pop. 236,994. The Apennines intersect it, and much of the country is mountainous and incapable of cultivation. The valleys and level districts are fertile, and in them large quantities of corn and wine are raised. Capital, Macerata.

MACERA'TA, a walled t. of central Italy, and capital of the province of the same name (formerly a delegation). Pop. 20,000. It is finely situated in the midst of hills, on a lofty eminence, 22 m. s.w. of Ancona, and commands picturesque views of the sea and the Apennines. The streets are straight and well paved, and there are some fine public edifices, including a cathedral with some good paintings, six other minor churches, and numerous conventual establishments. The palazzo comunale, or town-hall, is a beautiful building of the 13th century. Macerata has a university of high repute, and is a center of intellectual and social Italian life. The province contains a pop. '71, 236,719.

MACERS are officers attending the supreme courts in Scotland, appointed by the crown. Their duty is to keep silence in the court, and execute the orders of the courts, if addressed to them. They hold office for life, and are paid by salary.

MACFARLANE, ROBERT, 1734–1804; b. Scotland; educated at Edinburgh and was for a time editor of the *Morning Chronicle*. He published an edition of *Ossian* in the Gaelic, with a Latin translation, and it is said that he was concerned with Macpherson in the production of the Ossianic poems.

MACFARREN, GEORGE ALEXANDER, MUS.D., an English musical composer and essayist of high reputation, son of George Macfarren, a dramatic author and musician. He was born in London, Mar. 2, 1813, and his education was conducted at the royal academy of music, at which institution he became a professor in 1834. As an operatic composer, Mr. Macfarren is the most characteristic representative of the national English school—his aim being to revive the old English music in modern opera. His earliest dramatic work, *The Devil's Opera*, was produced in 1838; *Don Quixote* followed in 1846; and *King Charles II.* in 1849, which first brought out Miss Louisa Pyne in English opera. A cantata, *The Sleeper Awakened*, was brought out at the national concerts in 1850, *Lenore* in 1852, *May-day* in 1856, and *Christmas* in 1860. The opera of *Robin Hood* followed in the same year, which attained a popularity far beyond its predecessors, and was performed during a whole season to overflowing houses. The *opera di camera* of *Jessy Lea* followed in 1863; *She Stoops to Conquer* and *Helvellyn* in 1864. The oratorio of *John the Baptist* appeared in 1873. Mr. Macfarren's works comprise numerous other small dramatic pieces, as well as chamber music, vocal and instrumental, and several symphonies and overtures. He has also contributed largely to the literature of music. His *Rudiments of Harmony* were published in 1860; *Six Lectures on Harmony*, in 1867. In 1875 he became principal of the royal academy of music, and professor of music at Cambridge university, receiving the degree of doctor of music.

MCFERRIN, JOHN BERRY, D.D., b. Rutherford, Tenn., 1807; admitted as a preacher in the Methodist Episcopal church in 1825, and was a missionary for two years among the Cherokee Indians. In 1840 he began to edit the *Southwestern Christian Advocate* at Nashville, which he continued for 18 years; was in 1858 appointed book-agent of the Methodist Episcopal church; in 1866 was made corresponding secretary of the board of missions. He is the author of *History of Methodism in Tennessee*, 3 vols., and assisted in the preparation of *Redford's History of the Organization of the Methodist Episcopal Church, South*.

MACGA'HAN, JANUARIUS ALOYSIUS, 1844–78; b. Ohio; of Irish-American parentage. He commenced the practice of composition when quite young, and entered journalism as a correspondent. In 1868 he visited Europe, and at the outbreak of the Franco-German war was attached to the staff of the *New York Herald*, and accompanied the army of Bourbaki, whose defeat and retreat into Switzerland he described in his letters. He was in Paris during the *Commune* and wrote vigorous and graphic description of the scenes and incidents of the time. On one occasion he was arrested, and was preserved from death at the hands of the infuriated communists only by the intervention of the American minister. During the summer of 1871 he traveled through Europe, and in the autumn was ordered by the *Herald* to Russia, where he remained during the following year. The Russian expedition to Khiva in 1873 was attended by MacGahan in the capacity of correspondent of the *Herald*, despite the positive directions to the contrary of gen. Kaufmann, commanding the expedition. The pertinacity, shrewdness, and good-nature with which the American persisted in carrying his point insured his success; and, though at times hunted by Cossacks under orders to restrain him, he was able to fulfill his engagement, and convey intelligence to the journal employing him that reached the public in no other way. The information which he gained during the progress of this expedition was afterwards published by MacGahan in book-form under the title *Campaigning on the Oxus and the Fall of Khiva*. The latter part of the year 1873 was spent by MacGahan at his home in Ohio and in Cuba; and in the spring of 1874 he was in London, whence he was ordered by the *Herald* to proceed to Spain to report the Carlist outbreak of that year. He joined the army of Don Carlos, and accompanied it for ten months, continuing a voluminous and graphic correspondence with his journal during the progress of the campaign. While in Spain he fell into the hands of the republicans, was mistaken for a Carlist, and again owed his life to the intervention of the representative of his government. In 1875 he accompanied the *Pandora* expedition toward the north pole, organized by the editor of the *Herald* and capt. Allen Young, and on his return published an account of his experiences with the title *Under the Northern Lights*. He now resigned from the employ of the *Herald*, and entered that of the London *Daily News;* and in June, 1876, took his departure to join the Turkish army in the capacity of war-correspondent of that journal. But the progress of this duty soon brought to MacGahan's ears rumors of the commission of horrible barbarities by the Turkish guerrillas (Bashi-Bazouks) in Bulgaria, and he repaired to that country to witness for himself and to the world the truth or falsity of these statements. The horrible evidences of the malignant cruelty which had characterized Turkish warfare in Bulgaria roused in the American feelings of the most intense indignation, and he recapitulated the history of his experiences in the columns of the *Daily News* in language

which awakened the profoundest sympathy on the part of the British public, and, indeed, wherever the terrible story found readers. Concerning the extraordinary series of letters which at this period drew the attention of the civilized world to the columns of the *Daily News*, the following, from the pen of Archibald Forbes, who was long associated with MacGahan, will be read with interest: "MacGahan's work in exposing the Bulgarian atrocities of 1876 produced very remarkable results. As mere literary work there is nothing that I know of to excel it in vividness, in pathos, in a burning earnestness, in a glow that thrills from the heart to the heart. His letters fired Mr. Gladstone into a convulsive paroxysm of revolt against the barbarities they described. They stirred England to its very depths, and men traveling in railway carriages were to be noticed with flushed faces and moistened eyes as they read them. Lord Beaconsfield, then premier of England, tried to whistle down the wind the veracity of the exposures they made. The master of sneers jibed at the "coffee-house babble" that was making the nations to throb with indignant passion. A British official, Mr. Walter Baring, was sent into Bulgaria on the track of the two Americans, MacGahan and Schuyler, with intent to break down their testimony by cold official investigations. But, lo! Baring was an honest man with a heart; and he who had been sent out to curse MacGahan blessed him instead altogether, for he more than confirmed his figures and pictures of murder, brutality, and atrocity. It is not too much to say that this Ohio boy, who three years ago was laid in his all too-premature grave on the shore of the Hellespont, changed the face of eastern Europe." It is stated that, on leaving the unhappy Bulgarians, MacGahan said to them: "Before a year is past you will see me here with the army of the czar." This assurance was verified by the event. Early in 1877 he went to St. Petersburg, and accompanied the Russian column throughout the succeeding war, indefatigable in the pursuit of his professional duties and enthusiastic in the cause which he had taken so much to heart. He was preparing to attend the international congress at Berlin when he was struck down by fever, and died in Constantinople after a few days' illness, June 9, 1878. MacGahan was a type of a class of journalists whose names can be numbered on the fingers of one hand: Russell, Sala, Stanley, Forbes, MacGahan. After them come a long list of names, chiefly American, including Albert D. Richardson, John Russell Young, Eugene Schuyler, Whitelaw Reid, etc., through whose additional labors the art of the newspaper correspondent has become recognized and respected.

McGEE, Thomas D'Arcy, 1825–68; b. Ireland; emigrated to America when 17 years of age, and settled in Boston, Mass., where he contributed to the *Pilot*, of which he became editor. He returned to Ireland in 1845 and remained until 1848, writing for the Dublin *Nation* and interesting himself in the repeal movement. He again crossed the ocean, and for the next 9 years was the editor of the *New York Nation*, afterwards the *American Celt*. In 1857 he changed his residence to Canada, and established *The New Era* in Montreal, being also elected a member of parliament, a position to which he was constantly re-elected until his death. He was also twice a member of the ministry, and for one term president of the executive council. He was a prominent advocate of the movement for the union of the provinces, and drafted the plan on which that was afterwards effected. He opposed the Fenian movement, a fact which is supposed to have caused his death. He was assassinated April 7, 1868, by one Whealen, at the door of his hotel, after a night session of parliament. He was an able journalist, a brilliant public speaker, and the author of a number of important works. Among these are: *History of the Irish Settlers in North America, from the earliest period to* 1850; *History of Attempts to establish the Protestant Reformation in Ireland; Sketches of O'Connell and his Friends; Popular History of Ireland;* and a volume of poems.

MacGEOGHE'GAN, James, 1698–1760; b. Ireland; pursued his studies at Rheims, and taking holy orders became chaplain of the Irish brigade attached to the French army. At the instance of a number of distinguished Irishmen in the French service, he wrote in French a *History of Ireland*, which was translated into English in 1835.

McGILL, John, D.D., 1809–72; b. Philadelphia; emigrated in childhood to Bardstown, Ky.; graduated at St. Joseph's college; practiced law in New Orleans and in Kentucky; studied theology at Baltimore and Rome; took priest's orders in 1830 in the Roman church at Bardstown; preached in Lexington, Ky., and in 1850 was consecrated bishop of Richmond, Va. He took a prominent part in the Vatican council. He is said to have been an able preacher and a distinguished controversial writer.

McGILLIVRAY, Alexander, 1740–93; b. Ala.; son of a Scotch trader named McGillivray, and a half-breed daughter of a French officer. He received a good education at Charleston, and was for a time in mercantile business at Savannah, but soon came back to the Creek Indians, whom he led, on the royalist side during the revolutionary war. At its close he negotiated an alliance between the Creeks and Seminoles, and Spain; and he became an agent of the latter. In 1790 he was a party to a treaty granting a considerable territory to the United States, and was made a brig.gen. and U. S. agent.

McGILLIVRAY, William, LL.D., 1796–1852; b. Scotland; graduated at King's college, Aberdeen, where, and at Edinburgh, he studied medicine. He never took a medical degree, but devoted himself to his favorite study of natural history. In 1823 he

was appointed keeper of the Edinburgh university, and in 1831 curator of the museum of the royal college of surgeons at Edinburgh. In 1841 he was appointed professor of natural history in Marischal college, Aberdeen. His most important works are: *A History of British Birds*, 5 vols., 1837–52; *A Manual of British Ornithology*, 2 vols., 1840–41; and *The Flowering Plants of Great Britain and Ireland.*

MACGILLYCUDDY REEKS, the highest mountains in Ireland, forming a group in the w. of the county Kerry, and rising from the western shores of the lakes of Killarney, to the beauty of which their lofty heath-covered summits add an element of grandeur. The reeks cover an area of about 28 sq.m.; and Carran-tual, the loftiest peak, is 3,404 ft. in height.

McGREADY, JAMES; supposed to have been b. in Pennsylvania about 1760; after being educated at Jefferson college, entered the ministry of the Presbyterian church; labored for a time in North Carolina; in 1796 removed to s.w. Kentucky, where he was prominently connected with a remarkable revival of religion, which continued for several years, leading to the ordination of men to the ministry who had not received a regular theological training. These ordinations led to controversies which culminated in 1810 in the organization of the Cumberland Presbyterian church, a denomination of much strength and influence in Kentucky, Tennessee, and some other states.

McGREGOR, a village of Iowa, capital of Clayton co., on the Chicago, Dubuque and Minnesota railroad; pop. 2,074. It has excellent schools, 6 churches, 2 weekly newspapers, and manufactures of carriages, wagons, etc.

McGREGOR, JOHN, 1797–1857; b. Scotland; after engaging in business in Canada, returned to England and was sent by the government on commercial mission to several states on the continent. In 1840 he was made a secretary to the board of trade, which office he gave up in 1847, to accept a seat in parliament as a member for Glasgow. In parliament as previously he was a supporter of free trade. He was the author of, among other books, *Commercial and Financial Legislation of Europe and America*, 1841; *Commercial Statistics of all Nations*, 1844–50; and *History of the British Empire from the Accession of James II.*, 1852.

MACGREGOR, JOHN, b. at Gravesend, England, 1825; graduated at Trinity college, Cambridge, and entered at the Middle Temple in 1847. In 1849–50 he made a tour of Europe, Egypt, and Palestine, and on his return was called to the bar. He afterwards visited every European country, as well as Algeria, Tunis, the United States, and Canada; was a writer for *Punch* and other periodicals; in 1865 made a canoe voyage, of which he afterwards gave an account in a book entitled *A Thousand Miles in the Rob Roy Canoe on Rivers and Lakes of Europe*, Other voyages of the same kind followed, of which we have record in *The Rob Roy on the Baltic*, *The Voyage Alone in the Yawl Rob Roy*, and *The Rob Roy on the Jordan*, all of which have been widely read.

McGUFFEY, WILLIAM HOLMES, D.D., LL.D., 1800–73; b. Penn.; removed in youth to Ohio; graduated at Washington college 1825; was a professor in Miami university 1836–39; president of Ohio university 1839–45; and professor of moral philosophy in the university of Virginia from 1845 until his death. He was also the compiler of a series of readers and other school books, of which immense numbers were sold.

McGUIRE, HUGH HOLMES, 1801–75; b. Winchester, Va.; graduated in medicine at the university of Pennsylvania, 1821. Was professor of surgery in the Winchester medical college from its organization to its destruction during the civil war. He operated fifteen times for stone in the bladder without losing a case. He was vice-president of the American medical association in 1849.

McGUIRE, HUNTER HOLMES, b. Winchester, Va., 1835; son of Hugh Holmes; was made M.D. in 1855, and professor of anatomy in the Winchester medical college in 1858. Entering the confederate army as a private he soon became director of the 2d army corps of northern Virginia and medical surgeon to gen. "Stonewall" Jackson. Was made professor of surgery in Virginia medical college at Richmond. He has operated for stone in the bladder 47 times since the civil war, and contributed articles to medical journals, and has performed the operation of ligating the abdominal aorta, the patient living 12 hours afterwards. See LIGATURE.

MACHÆRODUS, a genus of extinct carnivorus animals of the feline or cat family, presenting the most specialized example of the carnivorous type known. The upper canines have a most extraordinary development, being long, saber-shaped, with finely serrated margins. The upper jaw has no true molars, and in the under jaw the premolars are reduced to 2 on each side. The dental formula is

$$i.\ \frac{3-3}{3-3};\ c.\ \frac{1-1}{1-1};\ pm.\ \frac{2-2}{2-2};\ \frac{0-0}{0-0} = 26.$$

These formidable flesh-eaters are called "saber-toothed tigers," but some of the species resembled the lion, and are spoken of as lions by some authorities; and were fully the size of the largest of the present *felis leo*. They had a wide distribution in space and time, their fossils being found in Great Britain, in various parts of the continent of Europe, in India and other parts of Asia, and in North and South America, ranging in

time from the miocene formation to the middle of the quaternary, or human age. The bones of *machærodus primæus*, from the Bad Lands of Dakotah indicate an animal somewhat smaller than the American panther; with smaller cranium and orbit, and also described as differing in dental formula from that given above, having 3 upper incisors, and 3 upper premolars on each side instead of 2, making in all 30 teeth instead of 26. There is another larger species from the same locality, but with less perfect remains. *M. cultridens*, from the tertiary of the Val d'Arno is of large size, having upper canines 8½ in. along the anterior curve, while *M. neogæus*; from quaternary caverns of Brazil was still larger, having upper canines projecting 8 in. beyond their sockets. The bones of these animals are often found along with those of several species of quadrumana, and of mammoth deer, bears, horses, elephants, and also various others of their own family, as hyenas, tigers, and extinct lions; in fact, they flourished in the age of mammals, and must have made sad havoc among the more defenseless animals.

MACHÆRUS, a strong fortress of Perea. Josephus says it was originally a tower built by Alexander Jannæus as a check to the Arab marauders. It was on a lofty point, surrounded by deep valleys, and of immense strength both by nature and art. After the fall of Jerusalem it was occupied by the Jewish banditti. The Jews say it was visible from Jerusalem. Its site was identified in 1806 by Seetzen with the extensive ruins now called *Mkrauer* on a rocky spur jutting out from Jebel Attarus towards the n., and overhanging the valley of Zerka Main. Josephus says it was the place where John the Baptist was imprisoned by Herod and beheaded by his order.

McHALE, JOHN, D.D., b. Tubbernavine, Mayo, Ireland, 1791; studied at Maynooth college, ordained priest in 1814, and appointed professor of theology; in 1825 was appointed assistant bishop of Killala; titular bishop in 1834, and archbishop of Tuam the same year. He wrote two series of letters on Roman Catholic emancipation; in 1827 published a treatise on the *Evidences and Doctrines of the Catholic Church*, which was translated into French and German; built a cathedral at Ballina; built or repaired 100 churches in his diocese; established numerous convents and parish schools; preached in Rome in 1831 several sermons which were translated into Italian; in 1848 he went to Rome and obtained from the pope the condemnation of the Queen's college in Ireland; in 1869 he procured from a council of Irish bishops a vote of censure of mixed education. He was a rigid Romanist, earnestly opposed Protestant missionary societies among his flock, and promoted the formation of Roman Catholic schools and colleges. He published Irish translations of 6 books of the *Iliad* and of the *Pentateuch*, and 60 of Moore's Irish melodies in the same meter as the original, with the ancient airs.

McHEN'RY, a co. in n. Dakotah, drained by the Mouse and Cheyenne rivers; 1650 sq.m.; the population of this and four other contiguous counties is given in the census of 1880 at 247. The surface comprises undulating prairie land, varied by large sand hills and buttes.

McHENRY, a co. in n.e. Illinois, on the borders of Wisconsin, drained by the Fox and Des Plaines rivers, and intersected by the Chicago and Northwestern railroad; 470 sq.m.; pop. '80, 24,914. This is a limestone region, having a flat surface, and generally fertile soil. The leading productions are Indian corn, wheat, oats, barley, hay, potatoes, flaxseed, wool, butter, and cheese. Co. seat, Dorr.

McHENRY, JAMES, 1753–1816; b. Md.; was an aid-de-camp to Lafayette in the revolutionary war, member of congress 1783–86, a member of the convention which framed the federal constitution, and secretary of war from 1796 to 1800. Fort McHenry, off Baltimore, is named after him.

MACHIAS, a t. in Maine, near the mouth of the Machias river; pop. '80, 2,203. It was settled in 1763, and incorporated in 1784. The inhabitants are somewhat engaged in the fisheries, and there are a few manufacturing establishments.

MACHIAVEL'LI, NICCOLO. See MACCHIAVELLI, *ante*.

MACHICOLA'TIONS, the apertures between the corbels supporting a projecting parapet. The machicolations are for the purpose of allowing projectiles to be hurled at an enemy when he approaches near the wall, as in scaling, undermining, etc. Such defenses are very common in castellated architecture, especially over gateways, towers, etc.

MACHINE-ENGRAVING has within recent years been introduced for the purpose of superseding, in whole or in part, the manual operations of the engraver. The first step in this direction was the invention of the ruling-machine by Wilson Lowry for the purpose of engraving plain backgrounds, skies, or any other portions where the work was purely mechanical. The saving of labor effected by this instrument was very great, and as its work was performed in a most satisfactory manner, it soon came into very general use. But what is properly denominated machine-engraving is executed wholly by machinery. This department consequently excludes all artistic work, and is generally restricted to the engraving of patterns, bank-notes, etc. For the engraving of bank-notes several machines have been invented, but their mechanism cannot here be described, as, besides being very complex, it is, for obvious reasons, kept secret as far as possible. The Americans have particularly distinguished themselves in this branch of engraving, and, in fact, it is to one of that nation, Mr. Perkins, that the introduction

of the bank-note engraving-machine is due. Perhaps the most perfect machine for engraving is that invented by Wagner of Berlin, and called by him the "universal rose engine, or guilloche machine," which consists of a number of machines capable either of separate or of combined action, the number of distinct instruments being co-extensive with the number of species of lines composing the pattern. The number and arrangement of the different instruments can be so varied that a practically unlimited number of patterns may be obtained, and the correctness and delicacy of these patterns is such as can hardly be surpassed.

MACHINE AND MACHINERY. See MECHANICAL POWERS.

MACHINERY, POLITICAL ECONOMY OF. It has never been questioned that machinery has added greatly to the productive power and the possessions of mankind, and has thus tended to place the poor more nearly on a par with the rich, by enabling them to obtain, at a cheap rate, articles of comfort and luxury of so good a quality as not to be capable of improvement by increase of expenditure. A mischievous fallacy has, however, often taken possession of the uninstructed, to the effect that machinery has a tendency to dispense with hand-labor, and so to benefit the consumer at the expense of the workmen. To clear away this fallacy, it is only necessary to remember that machinery itself must be made with hands; that the capital of a country will not be diminished by the employment of machinery; and that such capital must continue to be employed in paying wages, as of old. It is true that there is a shifting of the parties to whom the wages are paid. When the power-loom was invented, much of the capital that went to hand-weaving was spent on iron and wood for the construction of power-looms. It is a specialty of machinery that it is apt to train the hands to do but one thing, and that thing is liable to fluctuations. The remedy for this is in the working-man not supposing, as he too often does, that he has a right to be employed all his days in one special form of work, but in learning a variety of occupations, or rather learning the faculty possessed by intelligent people of turning the hand to a new function when that is necessary. It is of the more importance to keep this in view that some kinds of manufacture accumulate in certain districts where they can be best executed, and in these there arises a sort of monopoly in the manufacture for the time being, but this monopoly is liable to be broken and affected by many accidents. Thus, the war with America has lately in this way powerfully affected the cotton manufacture, and driven a large body of people either to find another occupation or to become paupers.

MACHINERY, POLITICAL ECONOMY OF (*ante*). The various questions that have from time to time arisen concerning the relation of machine labor to human labor have been entertained generally on a basis of pure speculation, owing to the absence of statistics whereupon to base positive reasoning. Of course, in the consideration of such a subject, the advocates of the largest use of machinery have the advantage. The blessings of the application of power to the reduction of human labor are prominent and undeniable. The multiplication of manufactures through the use of so powerful a force is a fact which cannot be gainsaid. The reduction of the possibilities of art to an automatic basis, thus relieving the individual mind from tension and the individual morality from responsibility, offers attractions. In the face of the absence of statistical evidence to the contrary, the absolute and positive deductions to be made from observation alone are all in favor of the most widespread employment of steam-power and machinery. It has, therefore, been comparatively easy for the advocates of the largest possible expression of mechanical force in manufacture, to formulate statements as argument, strongly sustaining their view of the question, and against which no well-founded objection could be made. Such statements have gradually assumed the character of the following propositions: 1st, that so-called "labor-saving" machinery enables the laborer to save his muscle and improve his mind; 2d, that it lowers the price of luxuries, and makes them measurably attainable by the laboring classes; 3d, that while displacing certain kinds of labor, it creates a necessity for certain other kinds, thus bringing about merely a change of relation and not of existence; 4th, it enables the prosecuting of vast enterprises, involving only the concentration of capital; 5th, it increases the capacity for foreign trade; 6th, it favors the laborer by procuring for him higher wages with greater purchasing power than were possessed by his forefathers. In support of these propositions, those who make them offer evidence which is patent to all as a matter of universal observation. As simple statements, taken by themselves, they are undeniable. Their acceptance involves, also, by a process of inexorable logic, the acceptance of the largest possible increase of mechanical power and machinery as beneficent agents in the constant improvement of the condition of the race.

But exactly here arises the action of a principle which has been fairly enunciated by Bagehot, in his *Physics and Politics*, to the effect that the tendency of reaction in natural law, which becomes potent when this is carried to an extreme, is, first, to bring about an equilibrium of conditions—which is dangerous; and, next, to produce a preponderance in the exercise of force in one direction or another—which is hurtful. The simplest form of expression of this principle is found in the conditions of life and activity as applied to every class of existence, in the threefold movement of growth, maturity, and decay. Its more complicated expression is the result of an abnormal and artificial activity; and this, it has been claimed, is incidental to the over-use of machinery: and the recognition

of this principle, it is claimed, establishes the possibility of such an over-use, and furnishes the first logical argument against the propositions advanced by the advocates of the largest possible employment of machinery. The application of the laws of mechanics to the construction of machinery dates back in positive history to about the 3d c. B.C. There are also hints at the existence of mechanism of various kinds at a much earlier period among oriental nations. It is worth remarking that the discoveries and inventions prior to the middle of the last century were all in the direction of *aiding* mankind in their labors, and that it was not until the first application of machinery to manufactures—in the period between 1690 and 1750—that this condition was changed, and that of *saving* labor contemplated. It is, however, a fact, that in 1618 a patent (number 6) was granted in England to David Ramsey and Thomas Wildgosse, which included in its specifications engines for plowing without horses or oxen, and for raising water to great heights; and a plan for making boats run "as swifte in calmes and more saff in stormes then boats full sayled in Greate Wynes." But of this and other inventions of the 16th and 17th centuries, there was no recorded result of "labor-saving." Half a century ago, Thomas Carlyle discerned a condition whose continued existence has since given occasion for much discussion of the political economy of machinery. Then he wrote: "Cotton cloth is already twopence a yard lower, and yet bare backs were never more numerous among us. Let inventive men cease to spend their existence incessantly contriving how cotton can be made cheaper; and try to invent, a little, how cotton at its present cheapness could be somewhat justlier divided among us." Following him, Thomas Love Peacock, an English author of distinction, wrote as follows: "Ports resounding with life, in other words, with noise and drunkenness, the mingled din of avarice, intemperance, and prostitution! Profound researches, scientific inventions, to what end? To teach the art of living on a little? To disseminate liberty, independence, health? No! to multiply factitious desire, to stimulate depraved appetites, to invent unnatural wants, to heap up incense on the shrine of luxury, and accumulate expedients of selfish and ruinous profusion. Complicated machinery: behold its blessings! Twenty years ago, at the door of every cottage, sat the good woman with her spinning-wheel. The children, if not more profitably employed than in gathering health and sticks, at least laid in a stock of health and strength to sustain the labor of maturer years. Where is the spinning-wheel now, and every simple and insulated occupation of the industrious cottage? Wherever this boasted machinery is established, the children of the poor are death-doomed from their cradles."

Next Emerson sounded a warning note: "A sleep creeps over the great functions of man. Enthusiasm goes out. In its stead, a low prudence seeks to hold society stanch; but its arms are too short; *cordage and machinery never supply the place of life.*"

And then John Ruskin, whose whole lifetime has been devoted to the exposure of error, the annihilation of sham, and the rooting-up of that which was untruthful, wrote in this wise: "If you find in the city you live in, that everything which human hands and arms are able, and human mind willing to do—of pulling, pushing, carrying, making, or cleaning—is done by machinery, you will come to understand what I have never yet been able to beat, with any quantity of verbal hammering, into my readers' heads, that as long as living breath-engines and their living souls and muscles stand idle in the streets, to dig coal out of pits to drive dead steam engines is an absurdity, waste, and wickedness."

It is thus obvious that to certain minds, and these of the deepest and clearest, the accepted and apparently obvious position of machinery in its relation to human labor has appeared to be at least doubtful. And this conclusion is not confined to the minds of statesmen and political economists. The instinct of the laboring-class scented a dangerous enemy from the period of the first application of power to machinery. The history of manufacturing in Great Britain, France, and Germany, from the date of the first intervention of this force, is pointed by constantly recurring periods of antagonism between the laborer and the machine. Between the political economist and the hand-worker there is a wide distance, which was bridged over in this instance by authors in every department of literature, and orators upon every subject. Adam Smith published his *Inquiry into the Nature and Causes of the Wealth of Nations* in 1766, at which date the use of machinery with the application of water-power was prevalent in England. In the work above-named, he says: "The liberal reward of labor, as it is the natural effect, so it is the natural symptom of increasing national wealth. The scanty maintenance of the laboring poor, on the other hand, is the natural symptom that things are at a stand, and their standing condition that they are going fast backward."

This being the fact, the relative condition of wages in connection with the employment and non-employment of machinery becomes an important factor in the question; so also does the relation of the product of machine-labor to capital; and no less the character of the product of machine-labor, as to whether it be of a better quality than that which can be produced by hand-labor. And the further question arises, whether the acknowledged increase of power to export manufactured articles, the result of the extended use of machinery, be economically beneficial to a country. All these points are to be considered—with others—in the endeavor to reach a just conclusion as to the main question. It is interesting to note that each of them has been considered—separately—by men eminent in different departments of learning. By combining conclusions

formed under such circumstances, it is practicable to gain an expression of opinion which cannot fail to be of value.

A few years since, when the balance of trade had first turned in favor of the United States, and shipments to foreign ports, already enormous, were increasing in a ratio quite unexampled, Mr. Edward Atkinson, an acknowledged authority, expressed himself as follows: "The alleged abundance of money consists of loanable capital in cotton, corn, coal, and the like, seeking use. It finds its first expression in the attempt to open foreign markets, *and the strange picture of an excessive shipment to foreign lands, while thousands in this country are insufficiently supplied.* The normal condition has to be reached, in which process the exports in ratio to numbers now excessive may again decline, and the exports and imports become nearly equal—*a condition far more consistent with true welfare.*"

The situation as here pictured, and which is certainly the direct result of the application of comprehensive mechanical power, will be seen to be analogous to that indicated in the passage heretofore quoted from Thomas Carlyle. Again, the multiplication of the possibilities of machinery is claimed, and justly, to have cheapened the cost of manufactured goods, and it is contended that this result is beneficent. An editorial writer in the New York *Tribune*, Aug. 7, 1878, attacked this question after the following fashion: "Go down the streets where cheap shops abound in any American city, and you will see these girls by the hundred flaunting along the sidewalk, with their sleazy dresses made up in the last fashion, their voices loud and defiant, their whole manner drunken with silliness and vanity. It is time we spoke the truth about this class, for it is from among them that the lowest of all classes is recruited every year. The majority of fallen women in this or any American city are not those who have sold their birthright for love, or who have been tempted to their undoing, but these vain, ignorant girls to whom dress and adventure are the wine of life."

Even the manufacture and use of the sewing-machine have not been without their opponents, prominent among these being Thurlow Weed, who alleges that these have resulted "in throwing tens of thousands of poor women out of employment, and affecting the morals of the country alarmingly." A writer in the New York *Times*, a few years since, made the following extraordinary statement: "The use of machinery not only is a fixed fact, but that use is constantly increasing; every person concerned with it, from the inventor who shapes the machine, to the user of it, acts for his own immediate benefit, and never troubles himself about the community; on the other hand, labor is superabundant, *and the question of social order and progress is really the question of the real effect of machinery on labor.*"

This, again, was more than paralleled by an utterance of ex-secretary Boutwell, to the following effect: "Thus faculty, which is a systematic expression of intellectual power, is recompensed, while *mere persons are becoming less important in the economy of labor.*"

And the following, translated from an article entitled *La Crise*, published in a French paper, the *Globe Illustré*, in Philadelphia, in 1877, is still more significant: "An English manufacturer has said and written: 'The insubordination of our working people has caused us to dream of the possibility of doing without them. We have made and encouraged all imaginable efforts of intelligence to fill the places of men by more docile instruments, and we are almost at the end. Mechanics has delivered capital from the oppression of labor. In fact, where we still employ a man, it is only provisionally; waiting the hour when there shall be invented for us the means of performing his duty without him."

Of course the bearing of all of this on the question of the value of machinery as a cause of positive displacement is obvious. The editor of the French paper quoted above thus expresses his view of the probable result of a condition such as that suggested: "What kind of a system is this which suggests delight to the manufacturer in the hope that society can presently dispense with men. Fool! If your workmen cost you something, are they not also your buyers? What will you do with your products, when, disabled by you, these workingmen no longer consume them?"

The ultimate object of an investigation like the one here undertaken is to discern, if possible, whether the net result of the constant increase in the use of machinery be or be not beneficial to the race. The antagonists to this increase, which, as they contend, has arrived long since at a point where it has become hurtful, respond to the propositions in favor of it, already given, as follows: 1st. That experience shows that there is no time gained to the laborer by the intervention of machinery; while on the contrary its employment is such a strain upon the physical and moral nature of those engaged in running it, *ex necessitate rei*, that so far from being enabled to "improve his mind," the machine-worker depraves both body and mind in the mere struggle for existence. It is claimed by those who make this assertion that "the large manufacturing centers are vortices of vice; and that the lives of those who are appendages to mechanism are not only of less duration than the lives of hand-workers, but that such are forced by the nature of their employment to sustain themselves by the free use of stimulants. The drunkenness, immorality, and general degradation of the slaves of the 'labor-saving' machine, as it is employed in manufactures, is patent in every manufacturing town

from Manchester and Sheffield to Lowell and Pittsburg." 2d. They allege that while machinery "lowers the price of luxuries," what were formerly necessities have now become luxuries to thousands by the operation of the same means, and it is manifest that the reduction of the cost of luxuries through the means of machinery to a price *almost* within the reach of the poor, must breed extravagance through added temptation. To that pleasant thing which is quite beyond our reach, we do not aspire; while for that which seems almost within our grasp, we have an insatiable longing. 3d. As to the displacement of human labor through the employment of machinery being apparent, and not real, they point to the constantly increasing prevalence of "tramping" as a business; to the low rate of wages; to the increased employment of prisons and alms-houses; and to the facts as to the capacity for displacement of the mechanical power in use, mathematically presented; and which must be real and not merely apparent in its application, since the means for restoring the balance must needs work so much more slowly. The number of persons in the United States engaged in manufactures by the use of machinery increased between 1850 and 1860, by 37 per cent, and between 1860 and 1870 by 56 per cent, an increase of 93 per cent in twenty years; of course representing, in combination with the quantity of mechanical power applied by each added individual, an amount of displacement quite incalculable. Meanwhile, the application of machinery to agricultural work caused a falling off of the percentage of increase in the number of hands employed, as between the same two decades, of 30 per cent. An illustration of the working of the application of machinery to farm labor in the matter of displacement occurs in the case of the Dalrymple farm in Dakotah, where, the harvest of 1880—cutting 25,000 acres of wheat, employing 20 steam threshing-machines, each with a man and a team, gotten out at the rate of 30 car-loads a day—returned a profit of $250,000, the yield being 35 bushels to the acre. A little reflection on these figures, as to the number of laborers that could be supported from this farm alone, were it worked by hand-labor, will leave a vivid impression as to the displacement in this direction. It is a fact that farming on this scale has not been found profitable in the long run. According to ex-secretary Boutwell, "the tools upon a farm of any given capacity cost at least four times as much as the tools then in use would have cost in 1840." The subject of displacement is entertained by the same authority, in general terms, as follows: "The steam power of England represents, stands for, is equal to, the muscular force of a hundred million full-grown men." It is further contended for this side of the argument, that the tendency of the use of machinery is to the displacement of intelligent and skilled hand-labor, and that its employment involves a comparatively unintelligent and monotonous application to a purely mechanical vocation. As was said in an editorial article upon this subject in a leading New York journal, speaking for machinery, and on the labor-saving nature of its work, "I will do this for you and save your muscles; do you wait on me, make me, and carry what I produce." But the press has not infrequently reached conclusions adverse to the doctrines held by the advocates of the largest possible use of machinery. An editorial article in the New York *Herald* thus expressed such an opinion: "Ninety per cent of our people can, with the machinery we Americans use, produce all that the whole people can consume. That means that 36,000,000 can produce all that 40,000,000 can use, and that, unless we re-establish our foreign commerce, 4,000,000 at least must remain idle, and are condemned to beggary or starvation." This was written when the balance of trade was against the United States: a reference to the citation from Mr. Atkinson heretofore given will show that an extension of foreign commerce did not remedy the evil. But the chief significance of the *Herald* statement rests in its presentation of the percentage of displacement. Thurlow Weed is responsible for the assertion that the increase in the use of machinery in the prosecution of farm-work "has thrown hundreds of thousands of men out of their ordinary employment." The N. Y. *Evening Post* of April 29, 1878, said, "The average daily wages earned by 2,042,209 working-men, as shown by the last census of 100 cities of America, was only 97 cents, and each had an average of only 180 days' employment a year." In 1850 the average annual wages of operatives in all manufactures, including mining and fishing, in the United States was $247, the net average product per capita $230, and the ratio of wages to gross product 22½ per cent. In 1860 these relations had changed to the following: average wages $288; average product $308; ratio of wages to gross product 20¼ per cent. In 1870 the decline of wages in these relations still continued, the average wages being $383, the average product, $392; ratio of wages to gross product 19½ per cent. Now, while the average wages in these industries combined was in 1870 $383 per annum, in manufactures alone it was $288, and in mining alone $482; while the ratio of wages to gross product in the latter industry was 48.75 per cent. And this clearly shows that as the laboring-man avoids connection with machinery his wages increase: the pay of hands engaged in copper-mining in the United States in 1870 was 67 per cent greater than that of operatives in the manufacturing industries. Carroll D. Wright, chief of the Massachusetts bureau of statistics, presented in his annual report for 1875 the figures resulting from an examination into the condition of 397 families of working-men in that state. By these it is shown that the wages (earnings) of these working-men varied between $221

for a day laborer, and $980 for an iron-roller per annum. Of these the highest earnings were those of blacksmiths, brick-layers, teamsters, carriage-smiths, etc., those who worked without the aid of machinery.

It is interesting to note by the foregoing statistics that with the increased use of machinery between 1850 and 1870 there was a steady relative decrease in the receipts of manufacturing operatives in relation to the net product per capita. Yet, as will be shown hereafter, while the operator lost, the capitalist did not gain. The same difference between the amount of wages of manufacturing operatives and those engaged in mining is found existing in Great Britain as in the United States. There mining wages average $375 per head, while those in manufacturing industries vary between $175 and $200. A further example of this relation is found in the fact that 167,000 persons employed in manufacturing machinery in English factories receive only an average of $4 per capita per week, while men engaged in ship-building get $1 per day. Again, in 1870 there were 5,404 hands employed in copper-mining in the United States, of whom 3,247 worked under ground; the average wages of these hands was $5 per capita. With regard to this whole matter of wages, however, it is only fair to take into consideration the purchasing power of money at different times. The authoritative statement of the superintendent of the census (1870) concerning this subject should certainly be received with respect. Bearing in mind that the estimates of wages given in this paper reach no later than 1870, attention is requested to the following: "After much thought, and extensive inquiry on the subject, the superintendent is disposed to regard 56 per cent as a just statement of the increase in price for all classes of mechanical and manufactured productions between 1860 and 1870." And while prices increased 56 per cent during the decade given, wages increased only 33 per cent ($288 in 1860; $383 in 1870). It may be mentioned, also, that while the wealth of the country, the capital invested in manufactures, and the gross annual yield of that capital, have all doubled in periods of eleven years, the wages of the operative have increased only 52 per cent in twenty years.

These figures, it is contended by those whose argument we are now presenting, tend to show that the over-use of machinery in manufactures reduces wages. Of course, general high wages cannot occur during a period of displacement. Mr. David A. Wells has stated that "the labor of 225 persons (with the aid of the improved machinery in use) is as effective in 1876, in meeting the demands of the country for cloth and food products, as was the labor of 691 persons in effecting similar results in 1838; and as a consequence of this change in the power of production, the labor of 466 other persons has within this time and within the special industries under investigation, been rendered unnecessary; and they have been compelled to enter into relations with new wants and new capabilities of purchase in order to find employment." But, on examining other spheres of employment, we are met by the same state of things, with the ratio against the laboring-man, if anything, enhanced. Thus, we learn from Mr. Wells, that, in the stove manufacture, "3 men can now, with the aid of machinery, produce as many stoves as 6 men unaided could have done in 1860;" also, that in the manufacture of straw goods, through the sewing-machine, 300 hands do more than 1000 could have done a few years ago. Again, Mr. Wells says: "In the manufacture of boots and shoes, 3 men working with machinery can do at present what, prior to 1860, required the labor of 6 men to effect, *while the individual or per capita consumption of boots and shoes in the United States has probably been more uniform during the same period than is the case with any other commodity.*" This last statement is important in showing that there is no abnormal or even healthy increase in the demand for boots and shoes, to compensate for the displacement effected by machinery; this, too, being one of the largest and most important of our manufacturing industries. Mr. Wells further states (quoting the census of 1870) that, "while the gain in the population in the United States from 1860 to 1870 was less than 23 per cent, the gain in the product of our so-called manufacturing industries during the same period, measured in kind, was 52 per cent, or nearly 30 per cent in excess of the gain in population."

Consulting further, on the subject of "displacement," Mr. Carroll D. Wright's admirable report (1877) on the statistics of Massachusetts, we are told that, by the mere *improvements* in machinery since 1845, the productive power of the shoemaker has been trebled, while in 10 years the productive power of the woolen manufacturer has been nearly doubled. According to Mr. Wright the total of steam and water power employed in Massachusetts in driving machinery is equivalent to the hand labor of 1,912,488 persons—the actual hand-labor in use being 266,339 persons in 1875. Here we have an admitted displacement of more than 1,600,000 persons; each hand-laborer having his powers multiplied by 6, through the agency of steam and water (and machinery). But, says Mr. Wright, "the industries of Massachusetts, without the aid of her motive power, would require a population of 7,400,000, or nearly 4½ times as great as it is now, to furnish the hand-labor necessary to carry them on." The ratio, however, according to this authority, differs in the following industries as given: In paper-making, each operative (plus machinery) represents the hand-labor of 18 persons. In the textile manufactures, the relation is 1 to 9. Each lumber-maker represents the power of 50 men. The statement as to the woolen manufacture would be incredible coming from any less authoritative source; 283 *operatives in* 1875, *added to the number*

employed in this industry in 1865, *produced very nearly double the quantity of cloth of the former number—a relation of* 1 *to* 70 *persons as regards displacement.* In 1810 the entire manufacture of carpets in the United States amounted to only 10,000 yards. In 1870 there were 689 carpet manufactories in the United States, employing 13,000 persons, at an average wage of $361 per annum, and producing carpets to the value of $22,000,000 annually. The rate of displacement in carpet manufacture through the use of the power-loom is as 1 to 3 in 2-ply ingrain carpets, and 1 to 9 in tapestry and Jacquard Brussels—this ratio being in regard to the number of yards produced, in comparison with the rate of production by the hand-loom. That is to say, 13,000 persons with power now manufacture what it would require 117,000 to make with the hand-loom.

Says Benson J. Lossing—a close and accurate compiler, and careful observer as well: "Extravagance in dress has become more marked since the civil war than at any time in the history of our country. It is not so much extravagance in taste as extravagance in cost. A fashionable woman now expects 4 or 5 new bonnets each year, costing $25 to $50 each; and some on which rich and rare laces are used may cost $200. Forty to one hundred and fifty dollars are now charged, sometimes, for the making and trimming of a single dress, in addition to the cost of the body material. Only by the use of the wonderful sewing-machine, that does the work of scores of nimble fingers in the same time, could the needle-work on the dresses of women now, even the plainest that are in fashion, be performed." The number of sewing-machines manufactured in the United States in 1874 was 528,503; in the four years preceding the centennial exhibition, the sales of this article averaged half a million a year. The entire sales of the American sewing-machine during the last 25 years are estimated to have numbered as many as ten million machines. The number of patents granted in the United States on sewing-machines and parts of machines since 1842 exceeds 1000, while there are more than 40 separate parts of the article, each of which has been the subject of a patent. The use of the sewing-machine, when compared with hand-sewing, is probably in the relation of 1 to 6; a displacement of the work of 5 persons for every machine used. The relation of machinery in the manufacture of watches to hand-labor is as 1 to 3½. Mr. Edward Atkinson mentions that a factory that uses 2,400 bales of cotton in a year, employs 300 to 500 working-men in the field; whereas in the mill it only employs 100 men, women, and children.

In 1856, M. Leplay, writing on the subject of labor in France, characterized the condition of things in a certain district by stating that the position of its manufactures —"ruined by machinery, had driven the working-people of the district to subsist on public charity. In witnessing the marvels of industry produced at the cost of so much suffering," the author demands "*Whether progress thus realized be not actually decay?*" The following pertinent remarks on this subject occur in an address of hon. Hugh McCulloch, July 4, 1878, at Woodstock, Conn.: "Idleness, especially enforced idleness, brews mischief and is dangerous to the state. Honest employment promotes virtue; idleness vice. Manual labor is reputable, although in no country is it properly respected. Laboring-men, as a class, are honest men. . . . . It is work that so many idle men—idle not through their own fault, but idle by the substitution of machinery for hands—are begging for, that families are starving for. . . . . It is not strange, therefore, that the laboring-man looks upon labor-saving machinery and implements as his enemies; and it is by no means certain that they are not. Looking at the labor question as humanitarians regard it, it is, indeed, questionable if labor-saving machinery is not working against the security of society and the welfare of the race. Political economists do not take this view of it. They care nothing for instrumentalities. They look only to results, and to results in a particular direction—the increase of the national wealth—as if the greatness of a nation consisted of its wealth alone, and not in the character and condition of its people."

We recur to the propositions of the friends of machinery. 4th. "It enables the prosecuting of vast enterprises, involving only the concentration of capital." This, as a simple statement of fact, is not disputed. The construction and consolidation of railroads; the foundation of vast manufacturing industries; the supplying of enormously increasing populations (to a certain extent) with the necessaries of life; and the providing of a smaller and more fortunate number with its luxuries,—these are demonstrable incidents which may be fairly included among the uses of machinery. But other questions occur; and when the investigator is met by the assertion that only 2 per cent of the business houses of the United States avoid bankruptcy; when it is known that nearly all the older railroads in the country have been at one time or another in the hands of receivers; when factories are periodically shut down, operatives on strike, and blast furnaces out,—it becomes, in the minds of a certain class of investigators, a question whether this consolidation and concentration of capital be not in itself a force reacting to the injury and loss of the very capital thus forced to unnatural uses. The employment of machinery in farm labor has greatly grown during the decade between 1870 and 1880. Comparison in this respect, made prior to 1870, shows some remarkable facts. In 1860 the amount of product (less material) from the capital invested in the manufacturing industries of the country, including mining and fishing, was $854,256,584, being 15¼ per cent less than the capital itself—$1,009,855,715. In 1870 the amount of capital employed had more than doubled (being $2,348,063,198), while the number of hands

employed had increased 56 per cent. Yet the ratio of product to capital in this latter year had fallen 4 per cent, the product, $1,891,575,749, being 19¼ per cent less than the capital. This is certainly a remarkable change in relation, when it is considered that the number of establishments, also, had increased 80 per cent—*a direct and tremendous increase in machinery.* Again, the amount of capital invested in machinery and buildings for manufactures being, as above stated, $2,348,063,198 in 1870: that invested in farming implements and machinery was $336,878,429. The product on the investment in manufactures (less the material used) was $1,891,675,749: that of agriculture was $2,447,538,658. The average product of each farm laborer was $850. The average product of each operative in the manufactures, backed by a capital invested in machinery six times as great as that similarly employed in farming, was $848. Deducting wages and interest on capital in each of these instances:

Manufacturing, share of wages	$377
" " " interest	73—450
Farming, share of wages	300
" " " interest	8—308

—we have a return to the manufacturer of $398 per operative, and to the farmer of $542. But whereas in the one case there is no important diminution of this net product, in the other we have the enormous expenditures for repairing and sustaining the vast organism of machinery involved, and the very large sums annually expended in improved machinery in order to sustain the competition which is a part of the very essence of mechanism. By this time the net return of the capitalist who has invested his money in manufacturing is reduced by a still further percentage below that of the farmer, who also has employed machinery, but has not so abused its use. But giving no consideration to these elements, there is still a difference in the net product per capita employed, as between the farmer and the manufacturer, of more than *one-third in favor of the farmer.*

Still another comparison to display the relation of profits with and without the over-use of machinery. The number of mining hands employed in the United States in 1870 was 154,328, their product $152,598,994, or $988 per capita. Making the same deduction of wages and interest on capital made in relation to agriculture and manufacturing, we have as a result a net annual return per capita of $471, an increase on that of the manufacturer of 10 per cent, *although the miner receives an average of* $483 *wages to the* $377 *of the manufacturing operative.*

Now, as precluding the claim that it is *over-use* of machinery which produces these curious results, it is only necessary to refer to the U. S. census for 1860 and 1870 to establish the following facts. (It is very likely to be generally assumed by the uninitiated that there was no such tremendous addition between 1860 and 1870 to the quantity of machinery previously existing in the country—as the tenor of this paper would seem to indicate. The facts and figures of the construction of machinery during the decade under consideration very clearly demonstrate the inaccuracy of any such assumption.)

In 1860 the amount of capital invested in the manufacture of machinery was	$35,959,068
In 1870 it was	101,183,597
The number of hands employed in 1860 was	41,172
In 1870	83,514
The wages paid in 1860	16,155,416
In 1870	47,866,882
Cost of material in 1860	21,405,673
In 1870	60,423,643
Number of establishments in 1860	1,383
In 1870	2,897
Gross product in 1860	51,887,266
In 1870	138,519,246

Thus it appears that the capital employed, the wages paid, and the material used in manufacturing machinery, had grown in 1870 to three times the amount of these in 1860; while the gross product on this investment had increased two and seven-tenths times during the same decade. *We had* 170 *per cent more machinery in the country in* 1870 *than we had in* 1860.

But now uprise some marvelous phenomena, by which it might be fairly reasoned that the lesson of 1870 should have closed every machine-shop in the land—*in the interest of capital.* There was a falling off in the gross product in this business, of 30 per cent; and in the average net product per capita of each of the hands employed, from $286.80 to $277.14 per annum. Meanwhile the average of wages had increased from $392.38 in 1860 to $573.16 in 1870. So that the operative returned to the capitalist in 1860 37 per cent less than his wages, and in 1870 less than half his wages. Here may properly be quoted the following statement recently made by Mr. Edward Atkinson: "It is in a quick distribution and ample consumption of products, rather than in the amount of accumulated capital, that the welfare of a community lies." The fact that

there may exist and seemingly thrive large business operations involving the employment of great numbers of human beings, hundreds of thousands of horse-power in steam or water, and tremendous capital, proves nothing, either in favor of hiving the human race, concentrating the natural forces, or limiting the movement of the circulating medium. Any large undertaking, once established, will run itself on its own momentum for a long period of time, without the slightest apparent regard for economic laws or scientific methods, and yet may fail at last. In such cases the capitalist, instead of living and saving from the profits of his business, exists merely on the usance of the large sums of money which pass through his hands—all this ending with failures, dishonesty, and general financial disaster.

"5th. It increases the capacity for foreign trade:" this statement is generally answered as already given in quotations from Carlyle and Edward Atkinson, and with the counter-statement that the increase of foreign trade which is fostered at the expense of home consumption cannot be healthy. The fact that American prints are sold on the market at Manchester, Eng., for 6d. per yard, while the same goods are gathering dust on the shelves and counters of stores in the place of their production, for lack of purchasing power in the American people to exhaust the supply, can hardly be esteemed an illustration of good political economy. "6th. It favors the laborer by procuring for him higher wages with greater purchasing power." While even this statement may be accepted as it stands, it is with a proviso that annihilates its value as an adjunct to the argument. And this because of the claim which is set forth and diligently sustained by the antagonists of too much machinery, viz., that the result of machine labor, the quality and character of its product, are so inferior that a great increase of expenditure is required in the direction of manufactured goods, to supply the same necessities which would be fully satisfied by the product of hand labor at a greatly lessened cost; thus rendering nugatory all possible advantage of increased wages (in certain directions), with increased purchasing power. When to this is added the fact of displacement through the concentration of wages in a few hands, it is claimed that the proposition is practically confuted. Says Charles Eastlake in his *Hints on Household Taste:* "But it is to be feared that instead of progressing we have, for some ages, at least, gone hopelessly backward in the arts of manufacture. And this is true, not only with respect to the character of design, but often in regard to the actual quality of the material employed. It is generally admitted by every housewife who has attained a matronly age, that linen, silk, and other articles of textile fabric, though less expensive than formerly, are far inferior to what was made in the days of our grandfathers. Metal-workers tell us that it is almost impossible to procure for the purpose of their trade, brass such as appears to have been in use a century ago. Joinery is neither as sound nor as artistic as it was in the early Georgian era. A cheap and easy method of workmanship, an endeavor to make a show of finish with the least possible labor, and, above all, an unhealthy spirit of competition in regard to price, such as was unknown to previous generations, have combined to deteriorate the value of our ordinary mechanical work." Mr. G. Phillips Bevan, in his admirable *Industrial Classes and Industrial Statistics*, article, "Paper," says: "The making of paper by hand is but seldom practiced now in this country (England), except by a few makers who have a specialty for best writing and drawing paper, the hand-made in these cases being considered superior to the machine-made" (p. 198). Mr. G. W. Smalley, the London correspondent of the New York *Tribune*, in a letter to that journal dated "London, Feb. 25, 1878," on book-binding at the Paris exposition, writes: "Machinery is largely employed, and the use of machinery is fatal. Commercially, perhaps, it is indispensable, but it is none the less destructive to artistic excellence in binding, as in most other things in which art has any share." Again, Mr. Bevan: "For many years the textile industry was carried on in the rural districts only. The power used was water. Water on the hill-sides was irregular in its flow; work was therefore irregular. When the stream was full, work was brisk (we should have called it excessive); when it was dry, the factory hands were employed on the lands, in hay-making, or other like operations. Thus the operatives were farm laborers as well as factory workers, and as manufacturing was not the complicated affair it is now, they were free from many of the evils which afterwards arose from the introduction of steam, and the immense enterprise and energy of our manufacturers." Speaking of the cotton-dust in the mills, he says: "The operatives showed the effect of this dust in their pale, emaciated faces, and in the bronchial irritation from which they constantly suffered, causing cough, anæmia, debility, diarrhea, and other formidable symptoms of pulmonary mischief, including expectoration, in which the cotton fiber was plainly visible by the microscope." "The physical strength suffers much in factories from confined heated atmosphere, loaded with fine cotton fibers, flinty sand, and cutaneous exhalations; the number of gas-lights, each light destroying oxygen equal to one man; transitions from the mills and their irregular temperature to their own dwellings; diet and drinks adapted to a heated employment, and stimulants to soothe an excited, nervous tension; vision always on the move; perception and volition, from the nature of their work, always in action. . . . No doubt factory physique is not good, but it is made worse by factory associates of vice and iniquity." Mr. Bevan adds that a series of questions addressed in 1873 to the certifying surgeons proved beyond doubt the fact of the degeneracy of the factory population.

The conclusion of the opponents of what they deem to be the abnormal employment of mechanism in manufactures may be set forth in the following authoritative statement: The superintendent of the census estimates the loss to the gross product of the wealth of the country to be $604.89 per capita of those not counted as producing (see p. 376 *Ninth Census*, vol. 3). This sum includes wages, and therefore the producing power per capita. The displacement of 3,000,000 of laboring-men by the over-use of machinery would therefore mean a loss to the annual product of the country of more than $1,800,000,000. When there is added to this sum the cost of supporting these 3,000,000 of idle men —say at 25 cents per day per head—we have a trifle over $2,000,000,000 per annum as the amount to be placed to the debit of the country, being, in fact, as much as the entire capital invested in the manufacturing industries of the United States. Against this it is set forth that no evidence has ever shown that there were 3,000,000 unemployed laboring-men at any one time in the United States. Admitting this, the computation as to the amount of existing idleness is open to any one, whenever it may seem desirable to make it. Those rejecting the figures afforded by the leading American journals, hereinbefore quoted, can easily obtain such data as may be procurable and establish results that will satisfy them. The application to these, whatever they may be, of the per capita loss in such a case as estimated by the superintendent of the census of 1870, will be found to be of value. It is evident that this important subject covers an immense field, and embraces a complexity of elements, physical, intellectual, social, and moral. To its solution all these departments must contribute.

MACHRAY, ROBERT, D.D., LL.D., b. England, 1830; graduated at Sidney-Sussex college, Cambridge, 1855; became dean and fellow of his college; vicar of Madingley, near Cambridge, which he resigned in 1865 to enter upon the bishopric of Rupert's Land, to which he had been appointed.

McILVAINE, CHARLES PETTIT, D.D., LL.D., D.C.L., 1798–1873; b. N. J.; son of Joseph, who was U. S. senator from New Jersey; graduated at Princeton, 1816; ordained in the Protestant Episcopal church, 1820, and officiated at Georgetown, D. C.; chaplain to the military academy at West Point and professor of ethics and history, 1825–27; rector of St. Anne's church, Brooklyn, N. Y., 1827–32, and, in 1831, professor of the evidences of revealed religion in the university of the city of New York; in 1832 consecrated bishop of the diocese of Ohio, in connection with which he was also president of Kenyon college at Gambier, 1832–40, and afterwards of the theological seminary there. Among his published writings are *Lectures on the Evidences of Christianity*, 1832, and in many subsequent editions; *Oxford Divinity; The Holy Catholic Church; The Truth and the Life; Valedictory Offering; Family and Parish Sermons;* and contributions to many religious periodicals. His name is held in honor, without as well as within his own denomination, for Christian fervor as a preacher and writer, and for his combined gentleness and strength of spirit.

McILVAINE, JOSHUA HALL, D.D., b. Del., 1815; of Irish Presbyterian descent; graduated at the college of New Jersey, 1837; studied theology at Princeton theological seminary until 1840; pastor at Little Falls, N. Y., 1841–43; of the Westminster church, Utica, N. Y., 1844–48, during which time published *The Tree of the Knowledge of Good and Evil;* of the First Presbyterian church, Rochester, N. Y., 1848–60, towards the close of which years, delivered a course of lectures in the Smithsonian institution at Washington, D. C., on "comparative philology in relation to ethnology;" professor of belles-lettres in the college of New Jersey, 1860–70, in the last of which years published a work on elocution; since 1870 has been pastor of the High Street Presbyterian church, Newark, N. J. While performing the stated duties of these various positions, Dr. McIlvaine has also been a frequent contributor to the *Princeton Review* and the *Bibliotheca Sacra*. He is a brilliant and original thinker, having a forcible and graceful style, and is enriched with a wide range of learning.

McINTOSH, a co. in s.e. Georgia, on the Atlantic ocean, and having the Altamaha river on the s.w.; traversed by the Atlantic and Gulf railroad, and watered by the Sapelo river and Jones's and Doctor's creeks; 550 sq.m.; pop. '80, 6,241. It has a generally level surface and fertile soil; the productions are rice, Indian corn, sweet potatoes, and cane molasses; there is a large lumber interest. Co. seat, Darien.

McINTOSH, JOHN, 1745–1826; b. Ga.; an officer in the war of the revolution with the rank of col., and a maj.gen. of the Georgia militia in the last war with England, 1814–15. After the revolutionary war was over he settled in Florida, then in possession of the Spaniards, was seized by them on the supposition that he had designs against the Spanish government, and imprisoned a year in Moro castle at Havana. On his return he conducted a reprisal against a Spanish fort on the St. John's, opposite Jacksonville.

McINTOSH, JOHN B., b. Fla., 1838; a cavalry officer in the U. S. army in 1861, and actively engaged in the service in the campaigns in Virginia, Maryland, and Pennsylvania from 1862 to 1865. He was promoted to brig.gen., July 21, 1864, and brevet maj.gen. in 1865. At the battle of Opequan he lost a leg. In 1866 he was made lieut. col. of the 46th infantry. He retired from the service July 30, 1870, with the rank of brig.gen.

McINTOSH, LACHLAN, 1727–1806; b. Scotland; a son of John More McIntosh, who came to Georgia with Oglethorpe in 1736. Lachlan entered the mercantile house of Henry Laurens at Charleston, but was afterwards a land surveyor. At the beginning of the revolutionary war he was col. of a Georgia regiment, and in 1776 was made a brig.gen. In 1778 he led an expedition against the western Indians, was present at the siege of Savannah the next year, and was taken prisoner at the capture of Charleston in 1780. After the war he was a member of congress.

McINTOSH, MARIA J., b. Ga., 1803; removed to New York in 1835, and in 1841 published her first work, *Blind Alice*. Of her numerous works we may mention: *The Lofty and the Lowly*, 1853; *Meta Gray*, 1858; and *Two Pictures*, 1863.

McINTOSH, WILLIAM, 1775–1825; b. Ga.; a half-breed, who led the Creek Indians who adhered to the United States in the war of 1812. On account of his share in the treaty of Indian Springs, made in 1825, which granted to the United States large portions of the Indian lands, he incurred the hostility of many members of the Creek tribe, to which his mother had belonged, and was murdered by some of them at his own house.

McINTOSH, WILLIAM, 1796–1858; b. Ga.; an Indian of the Cherokee tribe, who became a Methodist preacher and missionary in Arkansas and the Indian reservation.

MACKARNESS, JOHN FIELDER, D.D., b. 1820; studied at Mereton college, England; fellow of Exeter college, Oxford; vicar of Tardebigge, Worcestershire, 1845–55; rector of Honiton, Devonshire, 1855–58; prebendary of Exeter, 1858; proctor in convocation for the clergy of the diocese of Exeter, 1865; advocated the disestablishment of the Irish church; was made bishop of Oxford, 1869. His brother, George Richard Mackarness, D.D., having been vicar of Ilam, Staffordshire, became bishop of Argyll and the Isles, 1874.

MACKAY, CHARLES, an English author, b. in Perth in 1812; educated in London and Brussels. From the age of 22 to 32 he was engaged on the London *Morning Chronicle;* then for three years editor of the Glasgow *Argus*. He lectured in the United States in 1858; established the London *Review* in 1860; was correspondent of the London *Times* from the United States during the great rebellion. He has subsequently resided in London. Mr. Mackay's prose style is remarkably terse and clear, abounding in poetical forms of expression. He published volumes of poems in 1834 and 1840; *Memoirs of Popular Delusions*, 3 vols., 1841; the *Salamandrine*, a poem, 1842; *Legends of the Islands and Other Poems*, 1845; *The Scenery and Poetry of the English Lakes*, and *Voices from the Crowd*, 1846; *Voices from the Mountains*, 1847; *Town Lyrics* and *The Battle*, poems, 1848; and a considerable number in volumes published since. *Lost Beauties and Perishing Graces of the English Language*, 1874, is one of his latest works.

McKAY, DONALD, b. Shelburne, Nova Scotia, 1809; learned the trade of ship-builder in New York; went into the business in Newburyport, Mass.; and in 1845 established a shipyard at East Boston that became famous for the splendid improvements introduced in the models of clipper ships of great size, built for the California and Australia trade. In 1853 he produced the ship *Great Republic* of 4,500 tons burden, which, for a time, was the largest in the world.

McKEAN, a n.w. co. of Pennsylvania, on the border of New York, traversed by the Philadelphia and Erie, and Buffalo, Bradford and Pittsburg railroads; 1000 sq.m.; pop. '70, 8,825. It is a mountainous region, containing coal and iron, and heavily timbered. The inhabitants are occupied in lumbering and dairying. Co. seat, Smethport.

MACKEAN, THOMAS, LL.D., 1734–1817; b. Penn.; called to the bar in 1757, and a member of the state assembly, 1762–79. In 1765 he was a member of the committee appointed by the congress of the colonies held at New York to draw up an address to the house of commons. From 1774 to 1783 he was a member of the continental congress, and in 1781 its president. From 1777 to 1799 he was chief-justice of the Pennsylvania supreme court, resigning his place to become governor of the state, which office he retained till 1808. He was the author of the state constitution of Delaware.

McKEESPORT, a borough of Alleghany co., Penn., on the Pittsburg, Washington and Baltimore railroad, 14 m. from Pittsburg, at the junction of the Youghiogheny river with the Monongahela; pop. 2,523. It is the center of an extensive coal-mining region; has 7 churches, good schools, 2 banks, 1 newspaper, 2 foundries, and manufactories of locomotives, railroad cars, lap-welded iron tubes, window-glass, lumber, etc.

McKEEVER, ISAAC, 1793–1856; b. Penn.; entered the navy in 1809, and in 1814 was in command of an American gunboat which was captured, after a severe struggle, by a British force in barges and boats upon lake Borgne, Louisiana. The American fleet consisted of 5 gunboats with 182 men, and the English force numbered more than a thousand. McKeever afterward rose to be commander and capt. and he was in command of the Brazilian squadron, 1851–54.

MacKELLAR, THOMAS, b. N. Y., 1812; early a proof-reader for the Harpers, and subsequently foreman and proprietor of a large stereotype foundry in Philadelphia.

He is the author of 3 volumes of verse: *Droppings from the Heart; Tam's Fortnight Ramble;* and *Lines for the Gentle and Loving.*

McKEN'DREE, WILLIAM, D.D., 1757–1835; b. King William co., Va.; was adjutant and commissary in Washington's army for several years, and was present at the surrender of Cornwallis at Yorktown in 1781; in 1788 joined the itinerant Methodist ministry; accompanied Asbury in his tour of South Carolina; in 1801 was sent by the bishops to preside over the Kentucky district, and to have the general supervision of the western conference, embracing Ohio, Kentucky, Tennessee, Virginia, and part of Illinois. He traveled extensively and preached with great eloquence and power. In 1808 he was made bishop. In 1809 he visited with Asbury a large part of the west and Canada. He preached nearly 50 years, 12 years he was presiding elder, and 27 years a bishop. He was a man of vigorous mind, great modesty, and devoted piety, and was honored by every class of society.

MACKENZIE, Sir ALEXANDER, 1755–1820; b. Scotland; emigrated to Canada, and was employed by the Northwestern fur company. In 1789 he set out on an exploring expedition from lake Athabasca, and followed to its mouth the river which has since been named after him. In 1792 he started on another expedition; this time towards the Pacific, to which he came in 1793. An account of both these expeditions is to be found in his *Voyages*, etc., 1801. He was knighted in 1802.

MACKENZIE, ALEXANDER SLIDELL, 1803–48; b. New York. His family name was Slidell; he entered the U. S. navy in 1815; became lieut. in 1825, commander in 1841; served in the West Indian, Brazilian, Pacific, and Mediterranean squadrons. He changed his name to Mackenzie in 1837 in honor of a maternal uncle. Capt. Mackenzie became celebrated in 1842 by an event on board his ship that for a time produced great excitement in the United States. While in command of the brig *Somers*, which had been manned chiefly by naval apprentices from the U. S. naval academy and school-ships, on its return voyage from the coast of Africa a serious mutiny was discovered among them. Its ringleader was a son of John C. Spencer, the secretary of war. After a trial he and two others were hung from the yard arm. Young Spencer had been a dangerous character from his boyhood, but was so well connected that the action of capt. Mackenzie was severely criticised as hasty and cowardly. But a court of inquiry fully sustained his action, and revealed a skillful plot of the youths to turn the brig into a piratical craft as soon as they should achieve their object. Capt. Mackenzie was ordnance officer in the Mexican war, and participated in the storming of Tobasco in June, 1847. He possessed decided literary ability as the following works will show: *A Year in Spain*, 1829–36; *Popular Essays on Naval Subjects*, 1833; *The American in England*, 1835; *Spain Revisited*, 1836; *Life of John Paul Jones*, 1841; *Life of Oliver Hazard Perry*, 1841; and *Life of Stephen Decatur*, 1846.

MACKENZIE, CHARLES FREDERICK, D.D., 1825–62, b; Scotland; took his first degree at the university of Cambridge in 1848, and became a clergyman in the church of England; after some service as a parish minister, obtained a fellowship at Cambridge and lectured there; 1854–59 was archdeacon at Natal, South Africa, under bishop Colenso; having returned to England to promote the extension of missions in Africa, he was appointed bishop of Central Africa, and was consecrated at Cape Town, Jan. 1, 1861; went to the Zambesi river with a company of missionaries and began his work at Magomero, but soon fell a victim to the climate, so fatal to Europeans.

MACKENZIE, Sir GEORGE, an eminent Scottish lawyer and politician, son of Simon Mackenzie, brother of the earl of Seaforth, was b. at Dundee in 1636, studied Greek and philosophy at St. Andrews and Aberdeen, and civil law at Bourges, in France, then—as he himself calls it—"the Athens of Scottish lawyers." In 1661 he acted as counsel for the marquis of Argyle, then tried by a commission of parliament for high treason. About the same time he was made a justice-depute, and among his other duties we find him, in 1661, appointed to repair "once in the week at least to Musselburgh and Dalkeith, and to try and judge such persons as are there or thereabout delated of witchcraft." He was soon after knighted, entered the Scottish parliament in 1669 as member for Ross-shire, and in 1677 was named king's advocate. Up to this point his career had been marked by a decidedly patriotic spirit, and he was even one of the most popular men in the country. In the midst of his professional labors, he prosecuted literature with great assiduity. In 1663 appeared his *Religio Stoici, or a Short Discourse upon several Divine and Moral Subjects;* in 1665 his *Moral Essay upon Solitude;* and in 1667 his *Moral Gallantry.* He also composed some poetry. His style is admirable for the time in which he lived; he was among the first Scotchmen who wrote the English language purely. Mackenzie cultivated the friendship of the great English writers of his day, and his own taste appears to have been excellent. Dryden, in his *Discourse on the Origin and Progress of Satire*, alludes to him as "that noble wit of Scotland." Unhappily, in the popular mind he is better known as criminal prosecutor in the memorable days of the covenant, in which capacity he earned for himself the ugly name of the "bluidy Mackenzie;" nor, we fear, can it be disproved—in spite of his liberal antecedents—that he became a willing instrument of despotism. He has, however, written a defense of himself, entitled *A Vindication of the Government of Charles II.* In 1678 appeared his *Discourse on the Laws*

ana Customs of Scotland in Matters Criminal; in 1684 his *Institutions of the Laws of Scotland;* and shortly after, he took the leading part in founding the Advocates' library. He then retired to Oxford, and died in London, May 2, 1691.

MACKENZIE, HENRY, a British novelist; was b. in Edinburgh in 1745; received his education at the university of his native city, and practiced as an advocate there. In 1804 he was appointed comptroller of taxes for Scotland. He died Jan. 14, 1831, at the advanced age of 86. His *Man of Feeling*, 1771, *Man of the World*, 1783, and *Julia de Roubigné* won him rather a high place among the authors of his time. There is in all of these works something of the minuteness of Richardson, with a peculiar soft and sentimental tone, partly derived from Sterne, but without much evidence of high genius. In 1778 Mackenzie began to edit a periodical called the *Mirror* (modeled after the *Spectator*), which lasted for 17 months, and was followed by the *Lounger*, in 1785, which lasted for two years. His contributions to these display a greater manliness of style than his fictions, and a considerable measure of wit and humor. He had the credit of being the first to direct public attention, by an article in the *Lounger*, to the merits of the poems of Burns. He afterwards entered into the controversy concerning the poems of Ossian, the authenticity of which he denied, and also wrote political pamphlets in support of Pitt's administration.

MACKENZIE, ROBERT SHELTON, LL.D., D.C.L., b. Ireland, 1809; educated at Fermoy, where he taught school after having studied medicine at Cork. In 1829 he edited an English country paper. The next year he went to London, where he was engaged in literary and journalistic work for 22 years. He had already contributed to a number of American periodicals, and had been, since 1834, the regular London correspondent of the New York *Star*. He came to New York in 1852, and wrote for various papers there till 1857, when he became the literary editor of the Philadelphia *Press*, so continuing till 1879, when he assumed a similar position on the Philadelphia *Evening News*. H. has published among other works, *Lays of Palestine*, 1829; an edition of the *Noctes Ambrosianæ*, 1854; *Bits of Blarney*, 1855; *Life of Charles Dickens*, 1870; and *Sir Walter Scott*, 1871.

MACKENZIE, RONALD S., b. New York, 1840; graduated at West Point in 1862, and appointed second lieut. of engineers; was engineer of the 9th corps in the second battle of Bull Run, where he was wounded, and of Sumner's division at Fredericksburg; engaged at Chancellorsville in laying bridges in advance of the army; followed the confederate forces through Maryland into Pennsylvania, took part in the battle of Gettysburg, and in following Lee after his retreat; was in the battles of the Wilderness; wounded before Petersburg in June, 1864; commanded a regiment during Early's attack on Washington, and a brigade in the battles of Opequan, Fisher's Hill, and Cedar Creek, where he was again wounded; was appointed brig.gen. of volunteers, and resumed command before Petersburg in Nov., 1864; commanded a division of cavalry at Five Forks, where he rendered important service, being brevetted maj.gen. for gallantry. At the close of the war he returned to duty with his corps, with the rank of capt., and in 1867 was appointed col. of infantry; but in 1870 was again transferred to the cavalry service, and assigned to duty on the Mexican frontier.

MACKENZIE, WILLIAM LYON, 1795–1861; b. in Scotland; emigrated to Canada in 1820, and was employed first on the works of the Lachine canal. In 1824 he became editor of the *Colonial Advocate*, a journal published at Niagara in opposition to the governing party. He was elected in 1828 to the provincial parliament, but was refused his seat on the ground of disloyalty to the crown. He was re-elected four successive times, until the government refused to issue another writ of election. In 1832 he appealed to the home government in England for redress of grievances, carrying with him the petitions of the Canadian reform party. He was first mayor of Toronto in 1836. In 1837, he headed an armed force in Toronto and demanded of governor Head that a convention should be called to discuss Canadian grievances and reforms, which was not acceded to. He resolved to open the revolution by seizing arms with a view to arrest the governor and his cabinet, and to declare Canada a republic. But his force was insufficient. The government troops drove him from Montgomery hill, near the city, Dec. 7, 1837, and after some skirmishing forced him to retire to Navy Island, in the Niagara river. From this safe retreat, within the limits of the United States, he issued a proclamation for volunteers, offering lands—to the value of $100 to $300—in Canada, when the revolution should be successful. Some American sympathizers joined him, and a larger number of Irish. The Canadian government outlawed him, and the U. S. government took steps to stop his violation of American soil for war on Canada. He was arrested by gen. Scott's order and sentenced to 12 months' confinement in the Rochester jail. When again at liberty he became a contributor to the New York *Tribune*, and his vigorous pen was always interesting if not instructive. In 1849 the Canadian government published a general amnesty. Mackenzie at once returned to Canada, was elected to parliament, where he made a useful member, and on his retirement from that body, until his death, published a weekly journal entitled *Mackenzie's Message*.

MACKEN'ZIE RIVER, an important river of the Dominion of Canada, discovered and first navigated by Alexander Mackenzie—from whom it derives its name—in 1789, has its origin under the name of *Athabasca river* (q.v.), in Mt. Brown, and after a n.n.e. course of 687 m. falls into lake Athabasca. Emerging from this lake as the *Slave river*, it receives the Peace river, and after another course of 210 m. falls into Great Slave lake (q.v.). It now assumes the name of Mackenzie river, and conveys the waters of the Great Slave lake to the Arctic ocean at Mackenzie bay, after a final course of 876 m., making a total of 1773 miles. In many places it is more than a mile in width, and it is navigable for steamboats throughout the greater part of its course from Great Slave lake. There is only one obstruction, and that not a material one, occurring near fort Hope, in lat. about 66° north. Its chief affluent is the Liard, which rises on the w. side of the Rocky mountains, and after a course of 380 m., forces its way through a pass, and after flowing first e. and then n., joins the Mackenzie river after a total course of 690 miles. The mouth of the river is closed from October to June by ice. See ATHABASCA and GREAT SLAVE LAKE and RIVER.

MACK'EREL, *Scomber*, a genus of fishes of the family *scomberidæ* (q.v.); having a spindle-shaped body; the tail becoming very slender, and slightly ridged or keeled on each side. Some of the species have, and some have not, air-bladders.—One species, the COMMON MACKEREL (*S. scomber*), is plentiful on the coasts of Britain, and of Europe, from the Mediterranean to the furthest n., also on those of Greenland, and on the American side of the North Atlantic ocean. It is a very beautiful fish, of brilliant green and blue, the males having nearly straight dark transverse bands, the females having the bands elegantly undulated. The tail is crescent-shaped. The mackerel is said sometimes to attain a length of 20 in., but is usually about 14 to 16 in. long, and about 2 lbs. in weight. It is highly esteemed for the table, and the mackerel fisheries of the s. of England and of the southern parts of Europe are very important. Mackerel is readily caught by bait, and particularly by any kind of bait moving swiftly through the water—a long slice cut from one of its own kind, or even a slip of red leather, or a piece of scarlet cloth. Boats engaged in mackerel fishing are therefore often under sail, and a smart or "mackerel" breeze is preferred. But the greatest quantities of mackerel are taken by nets; seine-nets wrought by two boats, and inclosing shoals of fish, or drift-nets—20 ft. deep by 120 ft. long—well corked at the top, and without lead at the bottom. Mackerel, after being taken, must be sent very quickly to market, as they very soon cease to be quite fresh. Fast-sailing boats are employed for this purpose, which purchase from the fishing-boats, and often employ the aid of steam. In France and some other parts of Europe, mackerel are often salted.—It was formerly supposed that great migrations of mackerel took place; but it is now believed, as in regard to herring, that they merely leave the deep water and approach the coast for the purpose of spawning. The time when they appear varies in different latitudes: in the s. of England, the mackerel season is in the end of spring and beginning of summer; in Orkney, it is in the end of summer. —Another species, the SPANISH MACKEREL (*S. colias*), which attains the weight of 4 or 5 lbs., and is more obscurely banded, is sometimes caught on the southern coasts of Britain, but is little esteemed. It has an air-bladder, which the common mackerel has not.—The Scad (q.v.) is sometimes called HORSE-MACKEREL.—The MACKEREL-MIDGE, a very small fish, is a species of rockling (q.v.), of the family *gadidæ*.

MACKEY, ALBERT GALLATIN, 1807; b. Charleston, S. C., where he was educated for the practice of medicine, but relinquished it for literature, especially pertaining to freemasonry. In 1850 he established a masonic monthly magazine in Charleston, and in 1858 a quarterly in the same interest. His works devoted to this order are: *Lexicon of Freemasonry; The Mystic Tie; Principles of Masonic Law; The Book of the Chapter; Text-book of Masonic Jurisprudence; Cryptic Masonry and Masonic Ritualist; The Symbols of Freemasonry and Manual of the Lodge;* and *Book of Constitutions of the Grand Lodge of Ancient Freemasons of South Carolina.* An enlarged edition of the Lexicon appeared in 1875 under the title of the *Encyclopædia of Freemasonry.*

MACK'IE, JOHN MILTON, 1813; b. Wareham, Mass.; a graduate of Brown university, and author of *Life of Godfrey William von Liebnitz; Life of Samuel Gorton; Cosas de España; Life of Schamyl, the Circassian Chief; Life of Tai-Ping-Wang, Chief of the Chinese Insurrection; From Cape Cod to Dixie;* and numerous contributions to the *North American Review.*

MCKIM, JAMES MILLER, 1810–74; b. Carlisle, Penn.; graduated at Dickinson college, and entered the ministry of the Presbyterian church. Soon after the organization of the American antislavery movement, he left the pulpit to devote himself to the cause of emancipation, which he served with marked ability and soundness of judgment until near the close of the war of the rebellion. As lecturer, organizer, corresponding secretary of the Pennsylvania antislavery society, and editor at times of the *Pennsylvania Freeman*, his labors were of great value. Near the close of the war of the rebellion, when the emancipation of the slaves had been proclaimed by president Lincoln, he resigned his office in the antislavery society to devote himself to the work of the Freedmen's aid commission. His earnest devotion, united with his soundness of judgment, clear moral insight, and wide experience, qualified him for eminent service in the work

of the new society. He was one of the founders of *The Nation* newspaper. Died in Llewellyn Park, Orange, N. J.

MACKINAW, a co. in Michigan, on the s. part of the n. peninsula; 1100 sq.m.; pop. '80, 2,902. It comprehends a number of islands, besides the mainland, the entire region being rough and uncultivated, and heavily wooded. The principal industry is lumbering. Co. seat, Mackinaw.

MACK'INAW, or MICHILIMACK'INAC, a village on an island of the same name, in the n.w. part of lake Huron, belonging to Michigan, 320 m. w.n.w. of Detroit, is an old French trading post, now a fashionable summer resort. Fort Mackinaw, on a bluff 150 ft. high, commands the village and harbor. It has extensive fisheries, and is a stopping-place for steamers plying between the lower and upper lakes. Pop. about 1000.

MACKINAW (*ante*), capital of Mackinaw co., Michigan; present pop. about 1500. The island is 3 m. in its longest diameter, and is n.e. of the strait of the same name. Many of the inhabitants are of French descent, as the place was early occupied by the French, and a missionary station established in 1699. The inhabitants were massacred by the Indians under Pontiac, the Ottawa chief, at the time of his attack on Detroit, 1763. The harbor is deep and safe, though small. The fish industry is very large and the village is a pleasant resort for summer tourists.

McKINSTRY, JAMES P., 1809–73; b. N. Y.; entered the navy in 1826, was made lieut. in 1837, commander in 1855, and capt. in 1862. He was in command of the the Monongahela at Port Hudson in 1863, and received severe injuries. He was appointed a commodore in 1866.

MACKINTOSH, Sir JAMES, a philosopher and politician, was the son of capt. John Mackintosh of Kellachie, in Inverness-shire, and was b. at Aldourie in that county, Oct. 24, 1765. He studied at King's college, Aberdeen, where his most intimate companion was Robert Hall, afterwards the celebrated Baptist preacher. From King's college he proceeded to Edinburgh in 1784, for the purpose of studying medicine; and after obtaining his diploma, settled in London, and for some time supported himself by writing for the newspapers. The first work that brought him into notice was his *Vindiciæ Gallicæ*, (1791), in reply to Burke's *Reflections on the French Revolution*. In sober philosophic thought, sound feeling, and common sense it greatly surpassed the splendid philippic against which it was directed, and was enthusiastically lauded by the liberal party; Burke himself thought highly of it. Fox, Sheridan, and other leading whigs sought the author's acquaintance; and when the "association of the friends of the people" was formed he was appointed secretary. About this time, he began to turn his attention to the legal profession, and was called to the bar in 1795, and attained high eminence as a forensic lawyer. In 1799 he delivered a course of lectures on the law of nature and of nations, before the benchers of Lincoln's inn, which were attended by audiences of the most brilliant description. His defense of Peltier (Feb. 21, 1803), charged with a libel on Bonaparte, was superb. It was translated into French by Mme. de Staël, and scattered broadcast over Europe. In 1804 he was appointed recorder of Bombay, for which place he sailed in the beginning of the year, arrived there in May, was appointed judge of the admiralty court in 1806, and remained till 1811. His Indian career was highly creditable to his capacity and honorable to his character. After his return to England he entered parliament as whig member for Nairn (1813), accepted the professorship of law in the college of Haileybury in 1818, and in 1830 became a member of the board of control under the Grey ministry, and spoke in favor of the reform bill. This was his last great political effort. He died not long after, on May 22, 1832. Every one *now* will regret that sir James Mackintosh ever turned aside to a political life. He was essentially a literary moralist and philosopher, and might have won a far higher and more enduring reputation than he has if he had resolutely prosecuted the calling for which nature intended him. His *Dissertation on the Progress of Ethical Philosophy*, written for the *Encyclopædia Britannica*, although very incomplete, and lacking that precision and profundity that can only be acquired by rigorous and extensive research, shows the admirable powers of the author, his breadth of view, tolerance, impartiality, love of truth and virtue, and his gift of calm and measured eloquence. For Lardner's *Cyclopædia* he wrote a brief but excellent survey of the history of England. An historical fragment (intended to form portion of a large work) entitled *History of the Revolution in England in* 1688, appeared after his death, and was pronounced by Macaulay to be the best history of the reign of James II. A collection of his miscellaneous works, including his contributions to the *Edinburgh Review*, was published at London, in 3 vols. See *Memoirs* of his life by his son, 2 vols. (Lond. 1835).

MACKLIN, CHARLES, 1690–1797; b. Ireland; changed his name from McLaughlin to the one under which he is generally known. After a rather reckless and wandering youth, during which period he was for a time identified with a dramatic company in the capacity of harlequin, he appeared at the Lincoln's Inn theater, London, in a small part, and from that time seems to have continued in the theatrical profession. In 1735 he was embroiled with a brother actor, and becoming the accidental cause of his death, was tried for manslaughter and convicted. Six years later, however, he was at Drury

Lane theater, where he made a successful appearance in the character of Shylock, occasioning Alexander Pope to write concerning his performance,

> This is the Jew
> That Shakespeare drew.

In 1753 he left the stage, and kept a tavern, varying this occupation by lecturing on oratory in Covent garden, in which vocation he was not successful. He returned to the stage in 1758, and continued to act until he had reached his century, when his strength failed him, and he made his final retirement. His powers of facial expression were so comprehensive, and his features so marked that Quin said of him, "If God writes a legible hand, that fellow's a villain." He wrote 10 plays, of which but two have remained to us, *Love à la Mode*, and *The Man of the World:* the latter of these pieces was revived, and produced at Wallack's theater, New York, a few years since.

MACKNIGHT, Dr. JAMES, an eminent divine of the church of Scotland, was b. at Irvine, in Ayrshire, Sept. 17, 1721; studied at Glasgow university, and afterwards at Leyden, in Holland; and in 1753 was ordained minister of the parish of Maybole. In 1769 he was translated to Jedburgh, and thence to Edinburgh in 1772, where he died, Jan. 13, 1800. Macknight was a superior scholar, a liberal, wise, and prudent ecclesiastic, and one of the most respectable writers that the church of Scotland has produced. His principal works are: *Harmony of the Four Gospels* (1756); *The Truth of the Gospel History* (1763); and *A New Translation of the Apostolical Epistles, with Commentary and Notes* (1795).

MACK VON LEIBERICH, KARL, Baron de, 1752–1828; an Austrian noted for his skill in the seven years' war against the Turks. He directed the allied armies against the forces of the first French republic and was noted for the excellence of his plans more than for their successful execution. He was utterly beaten in Italy by the French in 1798 and made prisoner; escaped and was in command of Austrian armies in Tyrol, Dalmatia, and Italy in 1804. In Oct., 1805, while in command of troops in Ulm he was compelled to surrender his entire force to the French under Napoleon. An Austrian court-martial condemned him to death; the government commuted the sentence to imprisonment for life, and in 1819 pardoned him out. He died near Vienna.

McLANE, ALLEN, 1746–1829; entered the American army as a volunteer in 1775, and served through the revolutionary war. He was a lieut. under Cæsar Rodney of Delaware, where he had settled just before the revolution. He distinguished himself at Long Island and White Plains, participated in the campaign in New Jersey, and was promoted to a captaincy in 1777. He next commanded the American outposts about Philadelphia, and was present at the battle of Monmouth, June 28, 1778. The next year he was a maj. in gen. Henry Lee's "legion," assisted in surprising the garrison of Paulus Hook, and was with Wayne at the capture of Stony Point, the same month. He was with the American army before Yorktown, till Cornwallis surrendered; but the close of the war found him comparatively poor, as he had sacrificed to the cause of the colonies a valuable estate near Philadelphia. After the close of the war he held a number of important civil offices; he was chosen a member, and afterwards speaker, of the Delaware legislature; a justice of the court of common pleas, and from 1808 till his death, collector of Wilmington.

McLANE, LOUIS, 1786–1857; b. Del.; at first entered the navy, but was afterwards called to the bar. He was a member of congress 1817–27, and was then chosen senator. From 1829 to 1831 he was minister to England, and on his return took a place in Jackson's cabinet as secretary of the treasury; but in 1833, having refused to give his consent to the removal of the government deposits from the U. S. bank, he was transferred by Jackson to the department of state. He retired from public life in 1834, and was made president of the Baltimore and Ohio railroad in 1837. In 1845 he was sent to London to take charge of the Oregon negotiations, and resigned on their conclusion.

McLANE, ROBERT MILLIGAN, b. Del., 1815; educated at Washington college and St. Mary's college, and at West Point. He was in the army from 1837 to 1843, when he resigned and was admitted to the bar. He was a member of the Maryland legislature 1845-47, and in the latter year was elected to congress, where he served two terms. President Pierce appointed him minister to China in 1853, and he remained there two years. He was U.S. minister to Mexico from Mar., 1859, to Nov., 1860, and has since practiced law in Baltimore.

MACLAURIN, COLIN, an eminent mathematician, was b. in 1698 in Kilmodan, in Argyleshire, Scotland. He was educated at Glasgow university, where he took the degree of M.A. in 1713; and after four years of close study obtained, in 1717, after a severe competitive trial, the professorship of mathematics in Marischal college, Aberdeen. In 1719 he visited London, and was received as member of the royal society, at the same time making the acquaintance of many eminent men, Newton among the rest. Here he published his *Geometria Organica* (1720), an elaborate treatise on the "description" of curves. He afterwards visited France in the capacity of tutor to a son of lord Polwarth, and while there wrote a dissertation *on the impact of bodies*, which gained the prize of the academy of sciences in 1724. The following year he was appointed assist-

ant to James Gregory, professor of mathematics in the university of Edinburgh, and soon after succeeded him in the chair. He died in 1746. His writings, distinguished for their originality, profundity, clearness, and elegance of style, gave a strong impetus to the study of mathematical science in Scotland. His works, besides those above-mentioned, are: *A Treatise of Fluxions* (Edinburgh, 1742), a work written in defense of Newton's discoveries against the attack of Berkeley, and the first in which the principles of fluxions were logically arranged; *A Treatise on Algebra* (1748), left incomplete by the author; *An Account of Sir Isaac Newton's Philosophical Discoveries* (Lond. 1748), also incomplete and posthumous, which contains explanations of all Newton's discoveries, the optical ones excepted; and a number of papers which were published in the Edinburgh *Philosophical Transactions*. His most important scientific investigations related to the "form of the earth," the "tides," and the action of the wind on the sails of ships and wind-mills. His memoir on the tides was, in 1740, presented in competition for the prize offered by the academy of sciences; but three other competitors, Euler, Daniel Bernouilli, and father Cavalleri, having appeared, the academy divided the prize among them.

MACLAY', ARCHIBALD, D.D., 1778–1860; b. at Killearn, Scotland; became a minister of the national kirk in 1802. He came to New York in 1805, and was pastor of a Presbyterian church in Rose street, but in 1808 he became a Baptist and founded a church in Mulberry street (since removed to Second avenue and called the Tabernacle), of which he was the pastor until 1837, when he became the agent of the American and foreign Bible society, which he served until 1850, and then became president of the American Bible union.

MACLE, a term employed in mineralogy to designate what are also called *twin crystals*, which are crystals united according to some precise law, yet not having their faces and axes parallel, so as to render the one a mere continuation of the other. In some macles the axes are parallel; in some they are inclined at an angle. Crystallization in macles is very characteristic of some minerals.

MACLE is the name of a mineral, also called CHIASTOLITE, a silicate of alumina, containing a little magnesia and oxide of iron. Macle has been much used for making beads for rosaries, etc.

McLEAN, a co. in central Illinois, watered by affluents of the Illinois river; intersected by the Illinois Central, Toledo, Peoria and Warsaw, Chicago and Alton, and Indianapolis, Bloomington and Western railroads; 1132 sq.m.; pop. '80, 60,115. The surface is generally prairie land, and the soil fertile; the productions are Indian corn, wheat, rye, oats, barley, potatoes, wool, hay, and butter. There are a large number of manufactories, including carriages, agricultural implements, cars, machinery, iron castings, saddlery and harness, etc. Co. seat, Bloomington.

McLEAN, a co. in n.w. Kentucky, watered by the Green river, and intersected by the Owensboro and Nashville railroad; 320 sq.m.; pop. '80, 9,293. It has a varied surface and fertile soil, and produces freely tobacco, wheat, Indian corn, wool, and butter. This county is heavily timbered. Co. seat, Calhoun.

MACLEAN, JOHN, D.D., b. at Portsey, Banffshire, Scotland, in 1828; studied at the university of Aberdeen; appointed curate at London, Ontario, in 1853; archdeacon of Manitoba, and professor of divinity in St. John's college in 1866, and bishop of the diocese of Saskatchewan in 1873.

MACLEAN, JOHN, LL.D., 1785–1861; b. N. J.; settled in Virginia in 1799. He at first worked on a farm, but in 1803 began to study law in Cincinnati, and was called to the bar. He was a member of Congress from 1813 to 1816, and then was made an associate justice of the Ohio supreme court, which office he retained until 1822, when he accepted from president Monroe the place of land commissioner; and the next year he became postmaster-general. He brought the post-office department to a high degree of efficiency for those times, and in recognition of his services congress raised his annual salary from $4,000 to $6,000. In 1829 Jackson, who had previously offered him a place in his cabinet, appointed him an associate justice of the U. S. supreme court. His most famous judicial opinion was delivered in the Dred Scott case, when, dissenting from the chief-justice (Taney) and a majority of the court, he held that slavery exists by force and not as of right, and that its regulation is a matter of local law. From his well-known opposition to the extension of slavery, he was a candidate for the presidential nomination of the free-soil party in the convention at Buffalo in 1848, and for the Republican nomination in 1856 and 1860. His only publications, besides his occasional addresses, are a number of volumes of law reports.

MACLEAN, LETITIA ELIZABETH (LANDON). See LANDON, LETITIA ELIZABETH, *ante*.

McLENNAN, a co. in central Texas, watered by the Brazos river; intersected by the Houston and Texas Central railroad; 960 sq.m.; pop. '80, 26,933. It has an undulating surface, comprising rich bottom lands and rolling prairies, the soil being remarkably fertile. The productions are Indian corn, wheat, oats, sweet potatoes, and cotton. Co. seat, Waco.

McLEOD, a co. in s. central Minnesota, drained by the s. fork of the Crow river, and intersected by the Hastings and Dakotah railroad; 504 sq.m.; pop. '80, 12,343. It has an undulating surface and fertile soil; productions: Indian corn, oats, wheat, barley, potatoes, wool, butter, and hay. Small lakes, prairies, and timber land afford diversity to the character of the surface; valuable timber abounds, including oak, elm, and ash. Co. seat, Glencoe.

McLEOD, ALEXANDER, D.D., 1774–1833; b. in the island of Mull, Scotland; emigrated to the United States in 1792; graduated at Union college in 1798; was ordained and installed pastor of the First Reformed Presbyterian church in New York in 1801, where he remained until his death. He was assistant editor with Dr. John Mason of the *Christian Magazine*. His chief works are: *Negro Slavery Unjustifiable; Ecclesiastical Catechism; Lectures upon the Principal Prophecies of the Book of Revelation; View of the Late War; The Life and Power of True Godliness*; *The American Christian Expositor; Messiah Governing the Nations*. He was prominent in the organization of the American colonization society in 1816, and wrote its constitution.

MACLEOD, HENRY DUNNING, b. Scotland, 1821; educated at Eton and Cambridge, and admitted to the English bar in 1849. He attained considerable distinction as an authority on economic and financial subjects, to which a number of his books are devoted, as: *Theory and Practice of Political Economy; Elements of Political Economy;* and *A Dictionary of Political Economy*. He has also been active as a law reformer and codifier; many of the changes and improvements in the poor laws of Scotland were originated by him; and between the years 1868 and 1870 he was employed, at the request of the British government, in digesting and codifying the law of bills of exchange.

MACLEOD, NORMAN, D.D., a divine of the church of Scotland, eminent for his pulpit oratory, his writings, and his liberal Christianity, was b. at Campbeltown, in Argyleshire, in 1812. He was educated at the university of Glasgow, and entering the church, became successively minister of Loudon in Ayrshire, Dalkeith, near Edinburgh, and the important barony church, Glasgow. He gained the degree of D.D. in 1858, was appointed one of the queen's chaplains in Scotland, and in 1869 was moderator of the general assembly of the church. In 1850 he visited Canada, and in 1867, India, on missions connected with the business of the church of Scotland. From 1850 to 1860 he edited the *Edinburgh Christian Magazine*, and from 1860 onwards was the conductor of *Good Words*, to which he contributed numerous tales, essays, verses, etc., many being republished. Among the most important and popular of his works are: *Reminiscences of a Highland Parish; The Old Lieutenant and his Son; Eastward; The Gold Thread; The Starling; The Earnest Student; The Home Education; Sermons*, etc. Dr. Macleod died at Glasgow June 16, 1872. See *Memoir*, by his brother, the rev. Donald Macleod (1876).

McLEOD, XAVIER DONALD, 1821–65; b. New York; son of Alexander; graduated at Columbia college, and admitted to orders in the Protestant Episcopal church in 1845. After preaching for a short time in a country parish, he traveled and studied in Europe. While abroad he became a Roman Catholic, and on his return engaged in literary pursuits. His publications are: *Pynnshurst: his Wanderings and Ways of Thinking; Life of Sir Walter Scott; The Bloodstone; Life of Mary, Queen of Scots; The Elder's House, or the Three Converts; Château Lescure, or the Last Marquis; The Weeder* and *The Saga of Viking Torquil*, two poems which have much merit. In 1857 he became professor of belles-lettres at Mount St. Mary's college, near Cincinnati, and was ordained as a priest.

MACLISE, DANIEL, R.A., an eminent painter of Scotch extraction, was b. at Cork, Ireland, Jan. 25, 1811; entered the royal academy, London, in 1828, and acquired a high reputation as a student. In 1833 he exhibited his first picture at the British institution, "Mokanna unveiling his Features to Zelica;" and in the same year, "All-Hallow Eve," and "A Love Adventure of Francis I. with Diana of Poictiers," at the royal academy. Since then, among his principal works may be mentioned: "Robin Hood and Richard Cœur-de-Lion," and "Merry Christmas in the Baron's Hall" (1838); "The Banquet Scene in Macbeth," and "Scene from Twelfth Night" (1840); "Play Scene in Hamlet" (1842); "Ordeal by Touch" (1846); and his design of "Shakespeare's Seven Ages" (1848); "The Gross of Green Spectacles" (1850); "Caxton's Printing-office" (1851). The frescos—each 45 ft. long and 12 ft. high—in the royal gallery of the house of lords, depicting "The Meeting of Wellington and Blücher on the Evening of the Battle of Waterloo," and "The Death of Nelson at Trafalgar," are admitted to be the finest mural paintings hitherto executed in Britain. The only pictures worthy of note exhibited by Maclise after the completion of these great works were: "Othello," "Desdemona," and "Ophelia" (1867); "The Sleep of Duncan," and "Madeline after Prayer" (1868); "King Cophetua and the Beggar Maid" (1869); "The Earls of Desmond and Ormond," posthumously exhibited in 1870, the year in which he died.

MACLURE, Sir ROBERT JOHN LE MESURIER, the discoverer of the north-west passage, was b. at Wexford in Jan., 1807, and was sent for his education first to Eton, and afterwards to Sandhurst. Intended for the military profession, but having no great love for it, he secretly left Sandhurst, and through the good offices of a friend, was entered as a midshipman on board the *Victory*. He volunteered for the Arctic expedition in H.M.S.

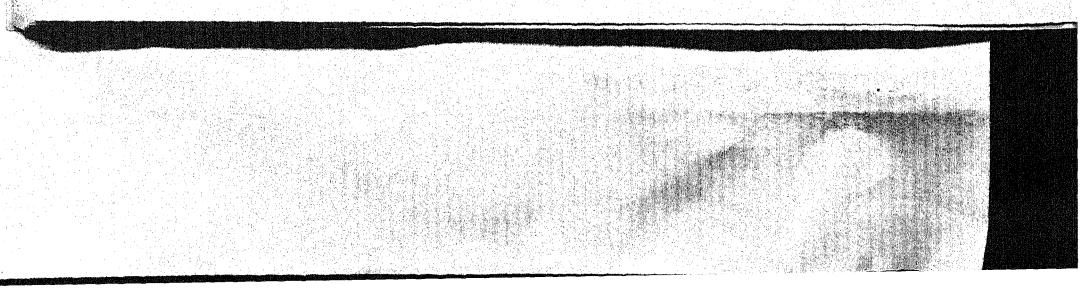
Terror, capt. Back, in 1836, returning to England in 1837. In Nov., 1837, he received his commission as a lieut.; and on June 18, 1842, was appointed to the command of the *Romney* receiving-ship at the Havana, where he remained until the early part of 1846. In 1848 he joined sir James Ross's expedition in search of Franklin; and upon its return in 1849 he was promoted to the rank of commander. This expedition had barely returned to England when it was resolved by the admiralty to dispatch the vessels composing it—viz., the *Enterprise* and the *Investigator*—on a fresh search for the Franklin party by way of Behring's strait. Accordingly, capt. Richard Collinson, C.B., was appointed as senior officer to the *Enterprise*, and commander Maclure to the *Investigator*. On Jan. 20, 1850, the vessels set sail, with instructions to make the best of their way to cape Virgins, in order to arrive at Behring's strait in July. The *Investigator* could not keep up with the *Enterprise*, which was towed through the strait of Magellan by a steamer some time before the *Investigator* got there. After rounding cape Horn, the *Investigator* met with her consort lying at anchor in Fortescue bay; but soon again they separated, and met no more during the voyage. Capt. Maclure now proceeded alone, in the *Investigator*, towards the ice-regions. On Aug. 2, after passing through Behring's strait, he spied, in lat. 72° n., ice right ahead. On the 8th his men first met with Esquimaux, close to point Pitt, where a party was sent ashore to erect a cairn, and place a notice of the *Investigator* having passed. These Esquimaux encouraged them in the belief that, as they proceeded eastward, they would find an open channel. As they proceeded, however, along the coast of America, the ice became troublesome and even threatening. There were also numerous shoals, which made the navigation intricate and dangerous. On Aug. 31 the *Investigator* reached cape Bathurst, from which she continued to advance for several days in a north-easterly direction. On Sept. 11 unmistakable signs of winter presented themselves. On the 17th the *Investigator* reached her most advanced position in lat. 73° 10′ n., and long. 117° 10′ w., about 30 m. from the waters of that series of straits called Melville, Barrow, and Lancaster, communicating with Baffin's bay. The ice now almost hemmed the vessel in on every side; and capt. Maclure determined to winter in his present position. The *Investigator* became finally fixed in the ice in lat. 72° 50′ n., and long. 117° 55′ west. On Oct. 22, capt. Maclure determined to reach the sea, if possible, by a sledge-journey. He accordingly set out with a party of men and officers; and, after sustaining much fatigue and privation, was at last rewarded on the 26th by a sight of the north-west passage. "The position of mount Observation, from which the important discovery had been made, was ascertained to be in lat. (observed) 73° 30′ 39″ n., long. 114° 39′ w., and by lunar 114° 14′ west." After this discovery the party returned to the *Investigator;* but that vessel was not destined herself to sail homewards through the passage discovered by her commander. All that winter and spring she remained frozen up in the ice. In July she began to move again, but the nearest she could get to the passage was 73° 43′ 43″ n. lat., and long. 115° 32′ 30″, 25 m. from the waters of Barrow strait. This was on Aug. 15, 1851. On the following day commander Maclure resolved to abandon this course, go round the s. end of Banks's land, and endeavor, by passing to the westward of it, to reach Melville island by that route. For 300 m. and more, the *Investigator* sailed in this direction without being once checked by ice. On Aug. 19, however, a sudden change came; the ice pressed against both sides of the vessel, and immense masses threatened to topple over and sink her with their weight. By Sept. 1 the *Investigator* became completely ice-bound about 50 yards from the shore. On the 10th, however, there was another change; the ice broke from the coast, carrying the *Investigator* with it, and she slowly sailed along for several days, until eventually she settled in a bay, where commander Maclure resolved to winter. To this bay he gave the name of bay of Mercy, in gratitude for the escape of the ship and crew from numerous dangers, as also because the neighboring land abounded in reindeer, hares, and other animals, which gave them good supply of food. In this bay they passed their second Christmas, and the time wore on until April, 1852, when commander Maclure visited Melville island with a sledge-party, in the hope of finding some of capt. Austin's ships, or at least a depot of provisions, but was disappointed. He returned to the vessel, where all was still well; but in May the scurvy broke out among his crew, and increased during the summer. Aug. came and still there was no open channel, and in the following month it became clear that they must pass a third winter in the ice. It now became necessary to decide what they should do for the future, as provisions were failing; and, accordingly, commander Maclure announced to his men that, in the following April, he would send away 30 of the crew to make their way homewards in two parties—one by way of North America up the Mackenzie river; the other by way of cape Spencer, Beechey island; while he himself, with the remainder of the officers and crew, would stay by the ship, spend a fourth winter, and then, if not relieved, endeavor to retreat upon Lancaster sound. The men cheerfully acquiesced; and when April came the sledges were got ready for the retreating parties. On the 6th of that month commander Maclure and his first lieut. were walking near the ship conversing, when they perceived a figure rapidly approaching them from the rough ice at the entrance of the bay. When within a hundred yards of them he shouted and gesticulated, but without enabling them to guess who it could be. At length he came up to them, and, to their joy and astonishment, announced himself thus: "I am lieut. Pim, late of the *Herald*, and now in the *Resolute*. Capt. Kellett is in

her at Dealy island." Pim had come from Melville island, in consequence of one of capt. Kellett's parties having discovered an inscription left by commander Maclure on Parry's famous sandstone rock in Winter harbor. Commander Maclure now resolved, although reluctantly, to abandon his ship altogether and return with capt. Kellett to England. He reached England Sept. 28, 1854. His first reward was to receive his commission of post-capt., dated back to the day of his discovery of the north-west passage. Shortly afterwards he received from her majesty the honor of knighthood. A reward of £10,000 was also granted to the officers and crew of the *Investigator*, as a token of national approbation of the men who had discovered *a* north-west passage from the Pacific to the Atlantic ocean. In Mar., 1856, sir Robert Maclure was appointed to the command of H.M. steam-corvette *Esk*, serving in the East Indies and China, but which returned to England in 1861. He died Oct. 17, 1873.

MACLURE', WILLIAM, 1763–1840; b. Scotland; came to this country in 1782, but returned to London, and engaged in mercantile business, from which he retired with a fortune. He made the United States his home after 1796, and went abroad in 1803 as a U. S. commissioner to settle the French spoliation claims. During this visit to the continent he pursued a course of geological study, making large collections of specimens. He had already determined to make a general geological survey of the United States, and on his return traveled extensively in furtherance of that object. The first account of his researches is found in his *Observations on the Geology of the United States*, which he read before the American philosophical society in 1809. He published a second paper in 1817, with a geological map of the United States. About this date he settled in Philadelphia, and was elected president of its academy of natural sciences, an office which he retained till his death. In the *Journal*, which he had founded as the organ of the academy, he published a description of the geology of the Antilles, which he visited in 1816. Three years later he went to Spain, where he bought a large tract of land from the government, then in the hands of the revolutionists, and endeavored to found a sort of agricultural school; but on the downfall of the provisional government the title to his land failed, and the experiment was abandoned. He afterwards entered upon a scheme of the same kind at New Harmony, Ind., which also was unsuccessful. In 1827 and again in 1828, he went to Mexico, and there he died. His library and most of his collection of maps and charts, with the sum of $20,000 to erect a building for their reception, were bequeathed to the Philadelphia academy of natural sciences; and many of his specimens were given to the American geological society of New Haven, Conn.

MACMAHON, MARIE EDME PATRICE MAURICE DE, Marshal of France, of Irish descent, was b. at Sully, July 13, 1808. Entering the army, he led a distinguished career in Algeria, and commanded the division that stormed the Malakoff at Sebastopol in 1855. He took a conspicuous part in the Italian campaign of 1859, received a marshal's baton, and was created duke of Magenta in commemoration of the battle of that name. He was nominated governor-general of Algeria in 1864. In the Franco-German war of 1870–71, he had command of the first army corps, was defeated at Wörth, and captured, wounded, at Sedan. In 1871, after the close of the war, he was made commander-in-chief of the French army, and in 1873 he was elected president of the republic, his powers being confirmed to him for a period of seven years. His sympathies were conservative, and at times seemed to be reactionary; suspicions of a *coup d'état* were more than once excited, especially in 1877. His refusal to sanction the dismissal of several generals known to be hostile to the now firmly established republican *régime*, led to his resignation in Jan., 1879.

MACMAHON, MARIE EDME PATRICE MAURICE DE, Duke of MAGENTA, Marshal of France (*ante*), and President of the republic of France; b. Sully, *Saone-et-Loire*, June 12, 1808; son of a *maréchal de camp* under Louis XVIII. in 1814, who was made a peer in 1827. He was of an Irish family, who took refuge in Burgogne on the fall of the Stuarts. He graduated at the college of St. Cyr in 1825, and entered the army; was in the campaign of Algiers in 1830; at the siege of Antwerp in 1831; returned to Africa, and acted as aid-de-camp to several generals; was wounded severely in 1837; resumed active service in 1840; and, in consequence of brilliant and arduous service in Algeria, was rapidly advanced from that time till 1849, when he had become a gen. of division and commander of the legion of honor. In 1855 Napoleon III. recalled him from Africa, and gave him a command in the n. of France. In August he was sent to the Crimea to command a division under Bosquet. He arrived at Sebastopol on the eve of an assault, and had the command of the most exposed and aggressive division of the army, which stormed the great citadel, Sept. 22, 1855. On returning to France he was made senator. In a body distinguished principally for its servility to Napoleon, MacMahon was remarked for the good sense and sturdy independence of his votes. In 1857 he was placed in command of a part of the army of Algeria, and in 1858 made supreme in command. In 1859, on the breaking out of the war with Austria, MacMahon was put in command of the 2d corps. June 2 his forces pushed back the advance of the Austrians, and two days afterwards he was the chief director of the battle of Magenta, in which he turned into a victory a defeat impending through Napoleon's inefficiency. At the battle of Solferino, a few days later, he again signalized his generalship by victory. In Nov., 1861, he was sent to Berlin to represent France at the



crowning of William III., king of Prussia. In Oct., 1862, he was commander of the 3d army corps at Nancy; and in Sept., 1864, was named governor-gen. of Algeria. In 1869 the plan of regal military government for Algeria was abandoned, and gen. MacMahon tendered his resignation. The war with Germany soon afterward opened. He was placed at the head of the 1st army corps, July, 1870. With 32,000 men and headquarters at Strasbourg, he seems to have separated his command strangely from the main army, and in the battles of Wissenberg and Reichshoffen suffered a crushing defeat by the Prussians. He conducted the retreat of 18,000 of his demoralized army to Châlons. There, placed at the head of a newly organized force of 120,000, he was ordered, Aug. 23, to march to the relief of Bazaine. Thiers had remonstrated against the order, and MacMahon's advice had not been asked. The army marched into the gulf of Germans prepared for it, without power either to help or to be helped by Bazaine. On Sept. 1 the German environment was complete, and resulted in another crushing defeat of the French and a severe wound to MacMahon.

After the treaty of peace in Mar., 1871, Thiers called him to the command of the army of Versailles, to recover Paris from the commune. After an energetic siege MacMahon entered the city May 21, and on the 28th, after seven days of sanguinary fighting with the desperate forces of the commune and their conflagrations, he was master of the city. In September, in submitting to an examination concerning the cause of the disasters of the French army in the beginning of the war with the Germans, he generously took upon himself the blame of the first defeats. When Thiers announced that he favored the establishment of a conservative republic, MacMahon was urged to assume dictatorial powers. He refused, and gave his hearty support to the Thiers government. But the clerical and royalist parties combined to place Thiers in such a minority that, after his definitive resignation in May, 1873, as chief executive, they united to elect MacMahon provisional president of France. The object was to insure the peace of France, while each royalist faction was preparing to bring in its king. MacMahon accepted the functions of president of the republic, with the remark that the vote "brought no modification of the laws or of existing institutions." His message to the assembly breathed a simple desire to conform his acts to its will as their sentinel, servant, and executor. His military habits and predilections made his administration seem to tend to monarchical reaction. But the subsequent years proved that, whatever may have been his private predilections, he intended to conform conscientiously to his inaugural promise to obey and to enforce the laws. Nov. 19, 1873, his term of office was extended to 1880. His powers were almost imperial. He alone, during his term, had the right to propose a revision of the laws. Jan. 13, 1876, he addressed a letter to the French people on the eve of the first general election under the constitution of 1875. In this address he announced his policy as "conservative and liberal"—a policy of repose for France, whose "institutions ought not to be revised before they are honestly tried;" all whose parties, therefore, were urged to rally around his government. This frank appeal was met by an unexpected return of a largely increased number of republicans to the assembly. There was a growing fear in France that the personal government of MacMahon, however honest he might be, was too like the imperial *régime*, and tended to some new form of despotism. The pronounced republicans had a clear majority over their combined opponents. MacMahon, in deference to public opinion, changed his cabinet in part to represent the views of the republican majority, and the new assembly, at its convention, gave a hearty support to the executive, and emphasized the desire of France to preserve order at home and peace abroad. On the second session of the assembly, Dec., 1876, the government found itself in a minority, and some friction took place between the president's desires and those of the majority, which resulted in a compromise, by which Jules Simon, a sterling republican, was made vice-president of the council of ministers, and Martel minister of justice and religion. The president had opposed and secured the defeat of a motion of Victor Hugo for the pardon of the banished communists; but during the year following he pardoned a large number of them by virtue of his powers under the constitution. In April, 1877, the bishop of Nevers wrote to the president, calling upon him to draw the sword against Italy for "the prisoner of the Vatican," to which he sent an answer that the bishop had exceeded the functions of his office. May 16 a crisis in the government was precipitated by a letter from the president to his chief minister, Jules Simon, suggesting that his policy was not satisfactory. The latter immediately tendered his resignation, which was at once accepted. This action was supposed to mark a determination to break with the republicans, and to support one of the parties of the right. At the opening of the chamber the following day, Gambetta made a motion: "that the confidence of the majority can be accorded only to a cabinent free in its action, and resolved to govern according to republican principles, which alone can guarantee order and prosperity at home and peace abroad." This was adopted by a vote of 355 to 154. A new cabinet was announced May 18, and the president addressed a message to the chambers in explanation of his policy, in which he called attention to his scrupulous adherence to the constitution of 1875 and to his selection of two successive ministers, Dufaure and Simon, for the supposed harmony of their views with the majority of the assembly; but that neither of them had been able to carry their measures by a majority; and that after these two attempts, equally devoid of success, he "could not take a step further in the

same path without appealing to, or demanding support from, another section of the republican party—that which thinks the republic cannot be firmly established without having, as a complement and consequence, the radical modification of all our great institutions—judicial, financial, and military administrations. This programme is well known. Those who profess it are agreed on all it contains," etc. . . . "Neither my conscience nor my patriotism permits me to share, even afar off and as regards the future, in the triumph of these ideas. I do not think it opportune, either to-day or to-morrow or at any period, that they should prevail. . . . I will neither try its application myself, nor facilitate its trial by my successors. As long as I am the depositary of power, I shall make use of it to the whole extent of its legal limits to oppose what I regard as the ruin of my country. But I am convinced that the country thinks as I do. It was not the triumph of these theories which it wished at the last elections." With much more of the same tenor, outspoken and decisive as to his distrust of the republic as outlined by Gambetta and the left, he decreed, by virtue of his power under the constitution, the adjournment of the chambers for one month. Within four days after the new ministry assumed office, prefects were changed in 62 departments, 225 out of 227 sub-prefectures received new offices, and all the influence and power of the government was developed to create a pressure of public opinion in its support. The day the message was read in the chambers, the deputies of the left, with Thiers at their head, prepared an address to the country, expressing the hope that "the nation will show, by its coolness, patience, and resolution, that an incorrigble minority cannot wrest from it its own government." Thus, the issue was fairly made up between the republicans and the bold and frank statement of the president that he wished to be supported in the singleness of his power. May 28, de Broglie, now chief minister, issued a circular, explaining that the president, in exercising his constitutional prerogative, intervened to arrest the progress of radical theories, etc., etc., and authorizing officers under the government to be vigilant to repress apologies for the commune and abuse of the president, and for the protection of morality, religion, and property. The president's new cabinet savored strongly of an intention to mold politics in France so as to promote the return of the young Napoleon to the imperial throne. Legitimists were excluded from it. June 11, their leader questioned the president as to the meaning of this action and as to a report, gaining credence, that he meditated a prolongation of his own power. They were assured that, "As to the legitimist candidates" (to the chamber of deputies), "they belong to the conservative groups, and any legitimist candidate really having any chance of success will be openly and loyally supported by the administration. With respect to schemes of prolonging my tenure of office during the prorogation, you may rest assured that I entertain none. I have received my right to remain in office until 1880 from the assembly, and I shall remain, unless a contingency I shall immediately point out to you shall arise. . . . I shall lend myself to no *coup de main* whatever. Let me also tell you that I shall lend myself to no venture of imperial, of monarchic restoration. . . . I shall participate in nothing favorable to the restoration, either of the prince imperial or of the comte de Chambord or of the comte de Paris. I am until 1880 invested with definite power by the constitution. I shall exercise that power, according to circumstances, to its full extent. . . . It will, perhaps, be necessary to demand a dissolution. If you accord it me, I shall use it as well as possible. If you refuse it, I should then have two forces out of three against me, and should withdraw."

When both chambers reassembled, June 16, the duc de Broglie ascended the tribune of the senate and read a message from the president asking their assent to the dissolution of the chamber of deputies. The message alluded to the manifesto signed by more than 300 deputies, protesting against the use made of his constitutional prerogative in proroguing the assembly, and to their appeals to their constituencies to oppose his measures, and deprecated the agitation which they were producing. It foretokened a prompt dissolution of the assembly, and an appeal to the country in a general election for new delegates. "Warned in time, guarding against all misunderstanding and ambiguity, France, I am sure, will do justice to my intention, and will choose for her representatives those who will promise to second me." To the chamber of deputies the president addressed a message, of which the following is a part, which was read from the tribune by Fortou, minister of the interior: "The president of the republic remains convinced, after two sincere but fruitless trials, that no ministry can hope to muster a durable majority in this assembly without asking to be backed by the party which professes radical doctrines, and without thereby promoting the progress of them. Full of respect for the institutions which govern us, and resolved to maintain them intact, he thinks himself entitled to employ all the prerogatives which they gave him to resist another step being taken in a path which seems to him to lead to the ruin and degradation of the country. He has chosen ministers who share his idea in this respect, and assume in the eyes of France the responsibility of it." The debate which followed between Fortou, Gambetta, and Decazes was stormy, and the right undertook to stifle it with their turmoil. The vote on the dissolution passed the senate by 150 to 130. The chamber of deputies was therefore dissolved, and by the same decree fresh elections for the new chamber were ordered within three months. The 363 deputies who joined in a protest against the first prorogation of the chamber, united to offer themselves as

one body for re-election. Nothing in politics can exceed the frankness of both parties in stating their positions and the clearness with which the issue was placed before the country. The canvass which followed was the most vigorously contested that had ever taken place in France. The republicans of all shades united on single candidates. The president was not so successful in securing unity of action, though the government pressure was used with an open energy that made its servants feel that they must leave nothing undone. The minister of the interior, Fortou, in his circular to them, said: "Functionaries of every kind are knit to the government which has appointed them by ties which they are bound not to forget. We cannot permit any of them to be hostile to us. Any who will use against the government the authority which they hold from it, need expect neither toleration nor indulgence." The death of M. Thiers, Sept. 3, was momentarily a blow to the republicans, but was turned to a source of strength by the grateful feelings of all France in reviewing his life, and by the knowledge that his hand had sketched the plan of the campaign against the measures of president MacMahon. On Sept. 19 the latter issued a manifesto to the French people, in which he drew the line against the "radicals," and called upon Frenchmen to sustain him personally in defense of the constitution and conservatism. The address was answered by one from Thiers, which, though prepared before his death, was suitable to the occasion. He pictured—as with a hand stretching from the tomb—how all the words recently used to create fear of the republicans had been used by every ruler who had by turns used and abused the confidence of the people of France. The means taken by the government of MacMahon to carry the election as the day approached were more tyrannical. Gambetta's expression that after the election "the president would have to submit or resign," brought him a penalty of three months' imprisonment and 4,000 francs fine.

The election, Oct. 14, resulted in a republican victory, by the return of 315 to 199 of the government candidates. The new chambers met Nov. 7, and elected Jules Grévy president. The government was at once called to account for its abuse of the system of official candidatures, and de Broglie was ready for the question. On the 20th the president changed his ministry again, to eliminate those whom the popular verdict had made without power in the chamber, and nominated men of moderate views who had not become obnoxious to the country. The following statement, made by gen. Grimaudet de Rochbouet, the newly appointed minister of war and "president of the council, was an illy conceived defiance of the republican sentiment. . . . . President McMahon has intrusted the ministry to men outside the political struggle. They will faithfully observe the law, and afford the marshal the support which he requires to facilitate commercial intercourse and the preparations for the exposition. We shall respect and require respect for the republican laws by which we are ruled. The constitution will pass intact from us to our successors *when president MacMahon judges opportune to replace us by parliamentary ministers.*" Jules Ferry moved "that the chamber consider that the ministry, by its composition, is a denial of the national rights of parliamentary law, and declined to enter into relations with it;" which was carried by 323 to 208. MacMahon's new effort to maintain his personal government under the constitution was thus signally unsuccessful; and Dec. 14, 1877, he yielded to the republicans, and gave Dufaure full power to form a cabinet from the left. Peace was thus restored; and the assembly, after passing essential appropriate bills, adjourned a week after the new ministry came into power. Eighty-two prefects were changed to represent the new republican control. On the reassembling of the chambers Jan. 8, 1878, de Rumilly, president of the senate, alluded to the president's message of December, as showing that he was not a tool of the ministers of the 16th of May.

In succeeding elections the republicans gained largely, and MacMahon seemed to conform so loyally to the verdict of the country against his former policy that Gambetta supported a motion of confidence in the executive council, which passed the chamber by a vote of 436 to 34. So strong was the reaction in the president's favor that, about this time, the republicans suggested him as an available candidate for a second term. MacMahon had the honor of opening and closing the great exposition of Paris of 1878. By the perfect order of the city, its marvelous cleanliness, and the harmony in the working of all the departments of the government, France showed that the republic had at last settled into a permanent beneficence. On the assembling of the chambers, Jan., 1879, a difference occurred between the president and his prime minister, Dufaure, concerning a decree for the removal of government subordinate officials not in sympathy with the republic. He yielded to his ministers on the civil lists prepared by them for removal, but when it came to the officers of the army designated to be superseded he refused, and declared he would rather resign. The council of ministers remained firm, and insisted on the removals. At 1 P.M., Jan. 30, the marshal sent in to the council his formal resignation as president of the republic. The ministers in council then offered their resignations, conditioned that he could form another ministry that would satisfy the chambers without executing their decrees of Jan. 20. The president replied in effect that he did not believe that possible. In the afternoon of the same day the ministers presented to the chambers the letter of resignation of the president. It contained these words: "The cabinet, in the belief of responding to the majority in the two chambers, now proposes to me, as regards the great commands, general measures which I deem contrary to the interests of the army, and consequently to those of the country. I

cannot subscribe to them. In view of this refusal the cabinet resigns. Any other cabinet taken from the majority of the chambers would impose the same conditions on me. I accordingly . . . . . resign the presidency of the republic. In leaving office I have the consolation of believing that, during the fifty-three years I have devoted to the service of my country as a soldier and as a citizen, I have never been guided by other sentiments than those of honor and duty, and by perfect devotion to my country." At 4.30 P.M. the two chambers assembled for joint-action to elect a president. Jules Grévy received 563 out of 713 votes, and was declared elected. Thus, within three hours and a half, the change in the executive head of the government had been made in accordance with constitutional forms, and marshal MacMahon retired to private life honored by all parties. In March following, when the question of the impeachment of the de Broglie ministry was under discussion in the chambers, marshal MacMahon wrote to president Grévy a letter, assuming the responsibility of the acts of his ministers of May 16, 1877, and claiming that, if they were to be impeached, he must be placed with them. The impeachment project was negatived. The ex-president is still living (1881), and regarded as an honest and able man, whose military education and life unfitted him, to a certain degree, to understand a republican form of government, and that order and stability among a people do not altogether depend on force or require a military *régime* to insure them.

McMICHAEL, MORTON, 1807–79; b. in Burlington co., N. J.; began at an early age to write for the press, and in 1844 became editor-in-chief of the Philadelphia *North American*, a daily journal of wide influence. He was an able writer and an eloquent speaker, and as a politician wielded a large influence. He was mayor of Philadelphia from 1865 to 1868, and died in that city.

MACMILLAN, HUGH, LL.D., b. Scotland, 1833; educated at Breadalbane academy and Edinburgh university. He was minister of the free church in Kirkmichael, Perthshire, in 1859, and five years later was transferred to the free St. Peter's church in Glasgow, where he remains. He has published *Bible Teachings in Nature* (1866), a work which met with great success, and has been translated into several continental languages; *First Forms of Vegetation; The True Vine; The Ministry of Nature; The Garden and the City; Sunglints in the Wilderness; The Sabbath of the Fields*, which has been translated into Danish and Norwegian; and *Our Lord's Three Raisings from the Dead*. He has also been a prolific contributor to periodical literature. He is an LL.D. of the university of St. Andrews.

McMINN, a co. in s.e. Tennessee; 480 sq.m.; pop. '80, 15,064. It is drained by the Hiawassee river and Chestna creek, and traversed by the Tennessee, Virginia and Georgia railroad. Corn and whisky are the staples. Capital, Athens.

McMULLEN, a co. in s.w. Texas, traversed by the Nueces and Frio rivers; 1250 sq.m.; pop. '80, 701. The breeding of stock is almost the only industry. The only town is McMullen.

McMURROGH, DERMOT, King of Leinster, Ireland. He became king in 1140, but was expelled by his subjects in 1168. Henry II. of England refused to aid him, but Richard de Clare, earl of Pembroke (surnamed Strongbow), restored him to power in 1170. The earl married the daughter of the king, and when the latter died, in the same year, the former succeeded him as king and as a vassal of England; laying thus the foundation of the English claim of supremacy in Ireland.

McNAB, Sir ALAN NAPIER, 1798–1862; entered the royal navy as a midshipman in 1813, and took part in the British expedition against Sackett's Harbor and other American towns. He left the navy, and became an ensign in the army, commanding the advance at the battle of Plattsburg. At the close of the war 1812–15 he remained in Canada, studied law, and was admitted to practice at the Canadian bar. He was elected to the legislature, became speaker of the legislative assembly, and prime minister in the government of the earl of Elgin, and that of sir Edmund Head, which followed. He was prominent in sustaining the government against the insurrection of 1837–38, being appointed col. of militia. While in command at Niagara he ordered the seizure of the steamer Caroline, which was conveying supplies to the rebels, from the American side, set fire to her, and sent her over Niagara Falls. This daring act was approved by the British government, and McNab was rewarded for it by being knighted. In 1841 he was speaker of the legislature; in 1858 was made a baronet; and in 1860 became a member of the legislative council.

McNAIRY, a co. in s.w. Tennessee, watered by affluents of the Big Hatchie river, and reached by the Mobile and Ohio, and Memphis and Charleston railroads; 620 sq.m.; pop. '80, 17,271. The productions are Indian corn, wheat, oats, wool, cotton, and sweet potatoes. A large proportion of this county is covered with a dense growth of ash, chestnut, hickory, oak, and other timber. Co. seat, Purdy.

MACNEIL, HECTOR, 1746–1818; b. Scotland; educated by his parents at home, and at a commercial school in Glasgow. After spending some time in the mercantile house of one of his relatives at Bristol he sailed for the West Indies, where he remained for six years. Some two years after his return to England, having lost the little property left him by his father, he secured the place of assistant secretary on the flag-ship of

admiral Geary; and afterwards held the same position on the flag-ship of sir Richard Bickerton, with whom he sailed to the East Indies. While in India he visited the sculptures at Elephanta, which he described in *Archæologia* for 1787. He spent five years in India, and on his return to Scotland settled near Stirling, and composed his poem called *The Links of Forth*. He next went to Kingston, Jamaica, to accept an office in the custom-house there, but ill-health compelled him to return, and on the homeward voyage he wrote a canto of his poem *The Harp*. For the next six years, still suffering from ill-health, he lived in retirement near Bannockburn, and composed *Scotland's Skaith*, his best work, published in 1795. At the end of this period he again sailed for Jamaica, where he recovered his health; and about the same time he received a legacy sufficient to enable him to live at ease for the rest of his life. He had written *The Scottish Muse*, a sort of poetical autobiography, while in Jamaica; and at Edinburgh, which he made his home henceforth, he published in 1812 *The Pastoral or Lyric Muse of Scotland;* in 1810 two satires under the name of *Town Fashions;* in 1811 *Bygone Times and Late Come Changes;* and in 1812 *The Scottish Adventurers*, an historical novel.

McNEIL, JOHN, 1784–1850; b. N. H.; capt. and afterwards maj. in the 11th regiment U. S. infantry in the war of 1812. The battle of Chippewa, July 5, 1814, was mainly decided in favor of the Americans by the bayonet charge made by McNeil's regiment, to whose command on that day, after the death of its col., he succeeded. For his gallantry in that action, and at Lundy's Lane, July 25, where he was severely wounded, he was brevetted lieut.col. and col. He continued in the service till 1830, was brevetted brig.gen. in 1824, and made col. of the first regiment of infantry in 1826. In 1829 he was made surveyor of the port of Boston, and retained that office till his death.

McNEILE, HUGH, D.D., 1795–1879; b. at Ballycastle, Antrim, Ireland; educated at Trinity college, Dublin, where he received the degrees of M.A. and D.D. in after years. He studied for the law, but in 1820 took orders, and after holding several preferments, was made canon of Chester, and in 1868 dean of Ripon. He was a popular preacher, of powerful diction and elegant delivery. Among his published works are lectures on the *Church of England, Prophecies of the Jews*, and sermons on the *Second Advent*, and many other topics.

McNEILL, Sir JOHN, D.C.L., b. Scotland, 1795; assistant ambassador to the Persian court in 1881, secretary of the Persian embassy in 1834, and envoy extraordinary to the Persian court in 1836. On his return to Great Britain in 1844 he was made chairman of the committee appointed to take charge of the operation of the Scotch poor-law act; and in 1851 he made a report to the government upon the condition of the western Highlands and islands. Four years later, under the Palmerston administration, he was put at the head of the board of inquiry appointed to investigate the proceedings of the commissary department during the Crimean war; and for his services in that capacity, he was sworn in of the privy council. He published in 1854 *Progress and Position of Russia in the East to* 1854.

McNEILL, WILLIAM GIBBS, 1800–53, b. N.C.; graduated at West Point, and entering the army, was attached at first to the artillery, and afterwards to the topographical engineers. He resigned from the army in 1837, and took up the profession of a civil engineer, in which he was eminently successful. He was chief engineer of a number of railroads, and of the dry dock in the navy-yard at Brooklyn. He assisted in making the survey for the Baltimore and Ohio railroad, and was president of the Chesapeake and Ohio canal company.

MACNEVEN, WILLIAM JAMES, 1763–1841, b. Ireland; studied medicine at Vienna, and practiced at Dublin. He was a member of the "United Irishmen," and for his participation in the designs of that organization was arrested in 1798, and imprisoned. Released in 1802 he traveled through Switzerland, writing a description of his travels in his *Ramble through Switzerland*. Soon afterwards he took a commission in the Irish brigade attached to the French service. Finding that his expectations of a French invasion of Ireland were baseless, he threw up his commission, and went to New York, where he resumed the practice of his profession. He was one of the editors of the New York *Medical and Philosophical Journal;* from 1808 to 1830 a professor in the college of physicians and surgeons, and at the medical school connected with Rutgers college in New Jersey. He published *Exposition of the Atomic Theory*, and *Pieces of Irish History*.

MACNISH, ROBERT, 1802–37; b. Glasgow, where he passed his life in practice as a physician. He contributed to *Blackwood's* and *Frazer's Magazines*, and became very popular. He published *The Metempsychosis*, 1825; *The Anatomy of Drunkenness*, 1827; *The Philosophy of Sleep*, and other works.

MACOMB', a co. in e. Michigan on lake St. Clair, traversed by Clinton river and the Grand Trunk railroad; 375 sq.m.; pop. '70, 27,616; co. seat, Mt. Vincent. The products are all the cereals, wool, butter, and hay. There are some manufactures.

MACOMB', a t. and vill., the capital of McDonough co., Ill., on the Chicago and Quincy railroad, 200 m. from Chicago; pop. of vill., 2,748; of t. 4,313. The McDonough normal college is here, and the place has good schools, a fine court-house, 3 newspapers, 2 banks, a foundry, and several wagon and carriage manufactories.

MACOMB', ALEXANDER, 1782–1841, b. Mich., entered the cavalry service of the United States in 1799, and rose to be lieut.col. of engineers and adj.gen. When the second war with England broke out he was transferred to the artillery at his own request, and in 1813, at the head of the 3d artillery, was at fort Niagara and the surrender of fort George. In January of the next year he was made a brig-gen. commanding the n. frontier along lake Champlain. In September of the same year he successfully defended Plattsburg, which was besieged by sir George Prevost, who had invaded New York with a force of 12,000 men. Upon the same day that Plattsburg was attacked, the British fleet on lake Champlain was defeated by commodore McDonough, and the British army retreated to Canada forthwith. For his conduct at Plattsburgh Macomb was made a maj.gen, and congress voted him its thanks and a gold medal, in recognition of his services. After the war he was commissioned a col. of engineers in the regular army, of which he became commander-in-chief in 1835. He was the author of *A Treatise on Martial Law.*

MACOMB', WILLIAM H., 1820–72, b. Michigan; entered the U. S. navy in 1834, and was appointed lieut. in 1847. He was on the *Plymouth* when the Chinese forts were bombarded in 1856, and was made a commander in 1862. He was on duty at various points on the Mississippi river through the year 1863, and in 1864 at the head of a squadron of gunboats took possession after a sharp struggle of Plymouth, N. C.; and was officially thanked by the navy department for his conduct on that occasion. He was appointed commodore in 1870.

MACON, an e. co. of Alabama, watered by branches of the Tallapoosa river, intersected by the Montgomery and West Point railroad; 700 sq.m.; pop. '80, 17,373. The surface is varied and the soil fertile; productions are Indian corn, rye, cotton, rice, sweet potatoes, and oats. Co. seat, Tuskegee.

MACON, a co. in s.w. central Georgia; drained by Flint river, and many creeks; traversed by the South-western railroad; 370 sq.m.; pop. '80, 11,675. The principal products are corn and cotton; chief town, Oglethorpe.

MACON, a co. in central Illinois, traversed by the Illinois Central, and Toledo, Wabash and Western railroads, and by a fork of the Sangamon river; 549 sq.m.; pop. '80, 30,672. The surface is level, and the soil fertile. The productions are tobacco, wool, cotton, Indian corn, wheat, Irish and sweet potatoes, and butter. There are a large number of manufactories, chiefly of agricultural implements and carriages. Co. seat, Decatur.

MACON, a co. in n.e. Missouri, traversed by Chariton and the e. fork of Salt rivers, and by the Hannibal and St. Joseph, and Northern Missouri railroads; 830 sq.m.; pop. '80, 26,223; co. seat, Macon city. There are mines of iron, lead, and coal, the latter very plentiful. Grain and tobacco are the chief products. The soil is well watered and fertile.

MACON, a co. in s.w. North Carolina, on the boundary line of Georgia, drained by the head-waters of the Tennessee river, having the Blue ridge range of mountains on the s.e.; 600 sq.m.; pop. '80, 8,064. The surface is generally elevated, and the soil is fertile, producing wheat, Indian corn, oats, Irish and sweet potatoes, tobacco, wool, butter, and hay. Co. seat, Franklin.

MACON, a co. in n. Tennessee, bounded by Kentucky on the n.; watered by branches of the Cumberland and Big Barren rivers; 260 sq.m.; pop. '80, 9,274. It has a varied surface, and fertile soil in most parts; and produces largely of tobacco, besides Indian corn, wheat, oats, Irish and sweet potatoes, cotton, etc. Co. seat, Lafayette.

MACON, a city of Georgia, U. S., at the head of the navigation, and on both sides of the river Ocmulgee. Pop. '70, 10,810.

MACON (*ante*), chief t. of Bibb co. in s. central Georgia; in size the fourth city of the state; pop. '80, 12,748. It is pleasantly situated on both sides of the Ocmulgee river, 85 m. s.e. of Atlanta and 30 m. s.w. of Milledgeville, on the Georgia Central railroad. It has a number of iron and other manufactories, 3 newspapers, 7 churches, and 6 banks. It is the seat of the Wesleyan college for women, and Mercer university. It is especially noted for the taste with which its streets and parks are laid out, and the great abundance of its shade trees. Several artificial mounds are found in the vicinity.

MACON, chief t. in Macon co., Mo., 175 m. from St. Louis, at junction of the Hannibal and St. Joseph, and St. Louis, Kansas City and Northern railroads; pop. '70, 3,678. It has 2 banks, 4 weekly papers, a factory, several schools and churches, and does a good country trade.

MACON (ancient *Matisco*), a t. of France, capital of the department of Saône-et-Loire, on the right bank of the Saône, 38 m. n. of Lyons. Macon carries on an extensive trade in wines known as Macon, as well as in corn, cattle, etc., and there are various manufactures. Pop. '76, 16,579. Macon has some Roman antiquities.

MACON, NATHANIEL, 1757–1837, b. N. C.; educated at the college of New Jersey, where he was an undergraduate when the revolutionary war broke out. Leaving Princeton in 1777 he enlisted as a private soldier in a volunteer company, but

after a short term of service returned to his home in North Carolina, where he began to read law. But he soon abandoned his legal studies, and declining all offers of a commission re-enlisted as a private in the regiment of his brother, col. John Macon. He remained in the army as a common soldier without pay till the treaty of peace in 1782; and at the close of the war could not be prevailed upon to accept any compensation or pension for his service. While the war was still going on he had been elected, though but 23 years of age, a member of the senate of his native state; and he retained his seat for five successive years. He served on some of the principal committees of that body, and he was conspicuous in his advocacy of measures to maintain the credit of the state, and to redeem and withdraw from circulation the paper currency. About this time he removed to a plantation on the Roanoke river, and devoted to agriculture all of his time left free by the care of public affairs. When the adoption of the new U. S. constitution came before the people of North Carolina, Macon opposed its ratification, as conferring too great powers upon the general government. He was a member of congress 1791–1815, and its speaker 1801–06. He was twice offered, by Jefferson, the office of postmaster-general, but refused it. He was chosen to the U. S. senate in 1816; was its president *pro tem.* 1825–27; and resigned his seat in 1828. While in congress he was in favor of the embargo, and was a qualified supporter of the war with England; but he would not vote for appropriation to increase the navy beyond a point sufficient to protect our line of coast, nor sanction the construction of additional forts. Throughout his congressional career he steadily opposed the policy of internal improvements. In 1824 he voted against the bill to make Lafayette a grant out of the public lands in consideration of his services in the revolution. The same year he received the electoral vote of Virginia for the office of vice-president. In 1835 he was president of the North Carolina constitutional convention, where he opposed state aid to internal improvements, a property qualification for the suffrage, and the extension of the right of suffrage to free negroes. The last public office which he accepted was that of a presidential elector in 1836.

MÂCONNAIS, the name of an ancient department of France, in the kingdom of Bourgogne, or Burgundy, and corresponding with what is now the arrondissement of Mâcon. It was conquered by Julius Cæsar from the Ædui, and fell into the hands of the Burgundians in the 5th century. It afterwards became a part of the empire of Charlemagne; St. Louis (IX.) purchased it in the 13th c., and united it to the domains of the crown; but in the middle of the next century it fell into the hands of the duke de Berry; then the crown obtained possession of it again; it was given to Philip the good, duke of Burgundy, by Charles VII.; and in 1477 again reverted to the crown. Capital, Mâcon.

MACOU'PIN, a co. in central Illinois; 864 sq.m.; pop. '80, 37,705; traversed by the Chicago and Alton, and Indianapolis and St. Louis railroads. The soil is fertile and diversified; there is some coal-mining, but the staple products are wool, grain, and cattle.

MACOY'A or MACAHUBA PALM, a South American and West Indian palm, called also macahuba palm and great macaw tree. It yields an oil used in making soap, to which it imparts a pleasant perfume. It is also used as an embrocation in rheumatism and other painful affections. It may be combined with hartshorn, when it forms a white liniment.

MACPHERSON, a co. of central Dakotah, 1260 sq.m.; recently formed. It is watered by the Maple and Elm rivers, branches of the Dakota. The surface is generally elevated, and in the w. part is the plateau du coteau of the Missouri.

McPHERSON, a co. of central Kansas, watered by the Smoky Hill and Little Arkansas rivers; 1080 sq.m.; pop. '80, 17,143. It comprises prairie lands, with a fertile soil, producing wheat, Indian corn, potatoes, and hay, and well adapted for stock-raising. Co. seat, Lindborg.

McPHERSON, EDWARD, LL.D., b. Gettysburg, Penn., 1830; graduated at Pennsylvania college in 1848; entered the profession of journalism at Harrisburg, Penn., and was elected to congress in 1858, serving a single term. He was clerk of the U. S. house of representatives from 1863 to 1869; secretary of the union national committee from 1860 to 1864; president of the republican national convention at Cincinnati in 1876; and is at present editor-in-chief of the Philadelphia *Press*. He has the repute of the foremost American political statist, having published a *Political History of the United States* and a *Political Manual*, and edited several numbers of *The Tribune Almanac*.

MACPHERSON, JAMES, a person who has obtained a remarkable notoriety in literature, was b. in 1738, at Ruthven, in Inverness-shire. After finishing his studies at King's college, Aberdeen, he became a schoolmaster in his native village, published a poem entitled *The Highlander* in 1758, contributed about the same time verses to the *Scots Magazine*, and in the following year, having met with the rev. Dr. Alexander Carlyle, minister of Inveresk, and John Home, the author of *Douglas*, he showed them some fragments of Gaelic verse, of which he also gave them "translations." These "translations" (16 in number) appeared in 1760, and were so much relished, that the faculty of advocates in Edinburgh raised a subscription to enable Macpherson to make a tour through the Highlands for the purpose of collecting more of the same. Macpherson was very zealous and successful in the "discovery" of literary treasures. *Where* he made his discoveries, however, no man knows. He found ancient MSS. in regions where no one before

had suspected their existence, and where no one since has been fortunate enough to obtain them. The result was the appearance at London, in 1762, of the so-called "Poems of Ossian," under the title of *Fingal, an Epic Poem, in Six Books;* and in 1763, of *Temora, an Epic Poem, in Eight Books.* A storm of controversy soon arose in regard to their genuineness, which has hardly yet subsided, but on the whole, we may safely say the verdict is unfavorable to Macpherson. See OSSIAN, POEMS OF. These poems were, however, the making of him in a worldly point of view. He was appointed surveyor-general of the Floridas (in 1764) with a salary for life, and agent to the nabob of Arcot—a very lucrative office—in 1779; entered parliament in the following year as member for Camelford, sat for ten years, and then retired to an estate which he had purchased in Inverness-shire, where he died Feb. 17, 1796. His body was brought back to England, and was actually interred (at his own request and expense) in Westminster abbey. Macpherson wrote in the latter half of his life a variety of historical compilations, pamphlets, etc., and translated Homer's *Iliad* into prose.

McPHERSON, JAMES BIRDSEYE, 1828–64; b. Ohio; graduated at West Point in 1853, and was appointed to the engineers. For a year after his graduation he gave instruction in engineering at the academy, and was next engaged as assistant engineer upon the defenses of the harbor of New York, and the improvement of Hudson river. In 1857 he superintended the building of fort Delaware, and of the fortifications in the harbor of San Francisco. In 1861, having been made first lieut. three years previous, he was assigned to duty at Boston, where he raised a force of engineers; and in Aug. of the same year he was promoted to a captaincy of engineers. The following Nov. he was made assistant engineer of the department of the Missouri, with the rank of lieut.col. Made chief engineer on the staff of gen. Grant, he took part in the capture of fort Donelson, Feb. 19, 1862, and in the battle of Shiloh, April 6, 7. In May he was appointed brig.gen. of volunteers, and col. in the regular army. He was with Halleck at the "siege of Corinth;" and when, after its capture by the federal forces, the confederates with a force of nearly 40,000 men, under Van Dorn and Price, attempted to retake it in Oct., 1862, McPherson succeeded in penetrating their lines and reinforcing Rosecrans, who had fortified Corinth with additional defenses, and was holding it with 20,000 men. For his services at Corinth, McPherson was promoted maj.gen. of volunteers, Oct. 8, 1862. In December he was put at the head of the 17th corps, and he had a most distinguished share in Grant's Mississippi campaign, which terminated in the surrender of Vicksburg. He led the advance up the left bank of the Big Black river, defeating the confederates at Raymond, May 12, 1863. The 17th corps was at the front of every movement in the campaign; it drove the confederates from their position at Port Gibson, after an all day's fight; it was engaged in almost continual skirmishes from the bayou Pierre to the Big Black river; it won the battle at Raymond without any aid from the rest of the army; and two days afterwards, with the help of Sherman's corps, which had joined Grant early in the month, it won another battle at Jackson. McPherson's corps was likewise conspicuous in the repulse of Pemberton at Champion hills, May 16, in the unsuccessful assault by the federal army before Vicksburg, May 22; and throughout the siege. After the capture of Vicksburg, McPherson was appointed a brig.gen. in the regular army, and commander of the district of Vicksburg. In Feb., 1864, he was next in command to Sherman in the latter's expedition to Meridian; and Mar. 12 was made commander of the army and department of the Tennessee. In that command, he kept up the reputation he had won in Mississippi, and rendered the most valuable services during Sherman's campaign in Georgia. The army of the Tennessee engaged the confederates at Dallas, May 28, 1864; and June 27, McPherson and Thomas made an unsuccessful assault upon Johnston's position at Kenesaw mountain. Early in July, Johnston abandoned Kenesaw, and retreated in the direction of Atlanta, closely followed by the federal forces. The confederates now took the offensive, and made almost daily attacks upon the union army; and in one of these, July 22, 1864, McPherson was killed. Gen. Grant, in a letter recommending him for promotion, in 1863, praises him as "one of the ablest engineers and most skillful generals."

MACQUA'RIE, a river of e. Australia, rises about 80 m. w. of Sydney, in the co. of Westmoreland, and has a n.w. course of 280 miles. Its waters are lost in marshes, whence issue tributaries of the Darling, of which river the Macquarie may be said to be one of the head waters.

MACQUER, PIERRE JOSEPH, b. at Paris in 1718, of a family originally Scotch, has acquired a reputation as a chemist and physician. He died Feb. 15, 1784. Macquer's principal works are *Eléments de Chimie théorique* (Par. 1741); *Eléments de Chimie pratique* (Par. 1751); and a *Dictionnaire de Chimie* (Par. 1776). See GASES.

MACRAUCHENIA, a genus of extinct ungulate animals allied to the tapirs, found in the tertiary deposits of Buenos Ayres and Patagonia. See PERISSODACTYLS.

MACREADY, WILLIAM CHARLES, an English tragedian, whose father was a manager of a provincial company, was b. in London Mar. 3, 1793, educated at Rugby, and made his first appearance as Romeo at Birmingham in 1810. For four years he was connected with his father's company, and for two years thereafter he sustained leading parts in the provinces. In Sept., 1816, he made his first appearance before a London audience, and

gained the applause of Kean, who was one of his auditors. His progress in the higher walks of the drama was slow, principally, it is understood, from professional jealousies. In 1819 he made a hit in the character of Richard III., and he afterwards adventured on other of Shakespeare's characters with success. In 1826 he made a tour in the United States, and he visited Paris in 1828. He became lessee of Covent Garden theater in 1837, and relinquished it two years thereafter. He afterwards undertook the management of Drury Lane, but gave it up after encountering considerable pecuniary loss. He visited America for a second time in 1843–44; and again in 1848–49, when he barely escaped with his life from a riot which took place in the theater at New York, caused by the jealousy of Mr. Forrest, an American actor. On his return home he was engaged at the Haymarket, and his theatrical career was brought to a conclusion on Feb. 3, 1851. He took his benefit at Drury Lane on the 26th of the same month. Shortly afterwards, a public dinner was given to the great actor, which was attended by 600 guests, and presided over by sir E. L. Bulwer. Macready died April, 1873. *Macready's Reminiscences and Selections from his Diaries and Letters* appeared in 1875.

Macready was a fine and impressive actor, but he was more indebted for his success to art than to nature. He succeeded best in the graver characters of the drama. He inherited more of the stateliness of Kemble than the fire of Kean.

McREE, WILLIAM, 1788–1832, b. Wilmington, N. C.; graduated at West Point in 1805; entered the army as second lieut. of engineers, and rose by regular promotion to the rank of lieut.col. in 1818. Prior to 1812 he was employed in the survey and construction of fortifications on the Atlantic coast. In the war of that period with Great Britain he served first as chief of artillery in gen. Hampton's northern army, and later as chief engineer of the army of gen. Brown, winning distinction in the capture and defense of fort Erie, and in the battles of Chippewa and Niagara, for which he was successively brevetted lieut.col. and col. After the war was over he visited Europe with maj. Thayer, under direction of the government, for professional observation and the purchase of professional works. After his return, in 1816, he was made a member of the board of engineers to which was assigned the duty of preparing a system of defenses for the Atlantic coast. He was engaged in this service until 1819, when the French engineer, gen. Barnard, was appointed "assistant engineer of the United States." Sharing with other officers of his corps the feeling that it was unjust to overlook the merits and claims of American officers and appoint a foreigner over them, he resigned. He afterwards rendered valuable service as surveyor-general of Illinois, Missouri, and Arkansas. Died in St. Louis.

MACRI'NUS, M. OPELIUS, 164–218 A.D., a native of Mauritania; became pretorian prefect under Caracalla, whom he assassinated on the expedition against Parthia in 217 A.D. He was at once chosen emperor by the army, and the senate confirmed the choice. He fought the Parthians, neither side gaining a decisive victory; made terms with them and returned to Antioch. His severe discipline aroused the anger of his soldiers, who were also united by the relatives of Caracalla, and after a reign of 14 months he and his son were put to death at Chalcedon and Heliogabalus ascended the throne.

MACRO'BIUS, AMBROSIUS AURELIUS THEODOSIUS, a Latin grammarian of the 5th century. He appears to have been by birth a Greek, but literally nothing whatever is known of his life. Two of his works remain, entitled *Commentarius ex Cicerone in Somnium Scipionis*, and *Saturnaliorum Conviviorum Libri Septem.* The former is the best known, and was much read during the middle ages; the latter is in the form of a dialogue, and contains many valuable historical, mythological, antiquarian, and critical observations. Of a third work, *De Differentiis et Societatibus Græci Latinique Verbi*, we possess only extracts made by one Joannes—thought by Pithou to be Joannes Scotus—in the 9th century. It has been warmly discussed—as if it were of consequence to mankind—whether Macrobius was a Christian or a pagan. The evidence for his being the former is that he speaks of God as *omnium fabricator* (the maker of all things), which must be reckoned as extremely slender; and of the latter his great admiration for the piety and wisdom of one Prætextatus, a heathen priest, and his reverence for Greek divinities. The *editio princeps* of Macrobius appeared at Venice in 1472; of later editions, the best is that of Gronovius (Leyden, 1670), reprinted by Zeunius at Leipzig in 1774.

MACROPIDÆ, a family of marsupial animals including the kangaroos and kangaroo rats. See KARGAROO and MARSUPIALIA *ante.*

MACROOM', a post and market town of the county of Cork, Ireland, situated on the river Sullane, 21 m. w. from Cork, with which it is connected by railway. The pop. in '71 was 3,193. The town consists merely of a single street, nearly a mile long, and contains some good houses and shops, but the great majority of the dwellings are mean and poverty-stricken.

McSPARRAN, JAMES, D.D., 1695–1757, b. in the n. of Ireland, and came to Narragansett, R. I., in 1721, as a missionary of the Episcopal society for the propagation of the gospel in foreign parts; was an intimate friend of bishop Berkeley at Newport; visited England in 1736; was an eloquent and popular preacher; wrote *America Dissected*, a historical and geographical treatise, which Updike has republished in his *History of*

the Episcopal Church in Narragansett, R. I. He was engaged at the time of his death upon an extended history of the colonies.

MACTRA, a genus of lamellibranchiate mollusks, having a somewhat triangular shell, broader than long, the valves equal; the animal with the siphons united to the extremity, and a large compressed foot. They are sometimes called trough shells. The species are numerous, and widely distributed; they burrow in the sand and mud of sea-shores, and of the bottom of the sea. The foot enables them also to move with activity, after the manner of cockles. Some of the species have shells of considerable beauty, others are coarse. Several small species are very abundant on the British shores, so that in some places they are gathered for feeding pigs, but not by those who have much regard to the quality of the bacon. The fossil species are few. The genus mactra is the type of a family, *mactridæ*.

McTYEIRE', Holland Nimmons, b. S. C., 1824; graduated at Randolph-Macon college, Virginia, in 1844, in which year he entered the ministry. He became pastor of a church (Methodist Episcopal) in Mobile, and in 1847 married Amelia Townsend, cousin of the widow of the late Cornelius Vanderbilt, whose family were members of his pastoral charge. During the years between 1848 and 1858 he was appointed to churches in New Orleans, and distinguished himself by being among the few pastors who remained with their people during the yellow fever epidemics which devastated that city. In 1851 he was made the first editor of the New Orleans *Christian Advocate*. In 1858 he was called to Nashville, Tenn., to take editorial charge of the central organ of the Methodist Episcopal church, south, there published. At the general conference he was elected and consecrated bishop, and fixed his residence in Nashville. When Cornelius Vanderbilt founded the university named after him, situated at Nashville, he named bishop McTyeire as the first president of the board of trust controlling the affairs of the institution, and intrusted to him the fullest powers and discretion as to its establishment and control. The deed of gift contained the only instance on record of vesting the veto power in the president of a board of trustees. This was done by commodore Vanderbilt in the instance of bishop McTyeire, at once to signify his profound confidence in him personally, and perhaps not less to indicate his faith in a "one-man power." To the president of the new university fell the chief responsibility concerning all its details of construction, organization, and adaptation to its comprehensive uses. Its success has been the best evidence of the sound judgment displayed by the founder in his selection.

MA'CULÆ is the term given by Willan and Bateman, and some other dermatologists, to one of the orders of skin-diseases. The affections included in the term maculæ can, however, hardly be regarded as diseases; they are merely discolorations of the skin, resulting from some change in the production of the coloring matter. The following varieties are recognized.

1. *Lentigo.*—This term is applied to those small yellowish or brownish-yellow irregularly rounded spots which are denominated freckles, and which are most abundant on the parts chiefly exposed to the light, as the face, hands, etc. In some cases, these spots are congenital, while in other cases they seem to be produced by exposure to the sun's rays; and in both cases they chiefly occur to persons of fair complexion with light sandy hair. When patches of a larger size than that of ordinary freckles are produced by exposure to the sun, the affection receives the name of *ephelis*. Congenital spots cannot be removed by any applications; but those which depend on exposure may be treated with soothing lotions or liniments, as an emulsion of sweet almonds, or a mixture of lime-water with almond oil.

2. *Pigmentary Nævus.*—This is a congenital dark discoloration of the skin, with little or no elevation of the surface, and often covered with hair. It usually occurs in small spots, but sometimes appears in large patches. It is perfectly harmless, and should not be interfered with.

3. *Albinism* or *Leucopathy.*—This affection has been already noticed in the article Albinos. When congenital it may be considered irremediable, but cases of partial albinism, occurring after birth, may sometimes be relieved by local stimulants.

MacVEAGH, Wayne, b. Penn., 1833; educated at Yale college, where he graduated with a high rank in the class of 1853. He studied law in the office of James J. Lewis, at Westchester, Penn., and began practice in that town. As a boy he had already exhibited much force as a debater, and by his oratorical powers and keen argument he soon gained a high place among the members of the state bar, and was intrusted with several cases before the U. S. supreme court. At the outbreak of the civil war he volunteered, and was commissioned maj. of a cavalry regiment, but was soon forced to resign by ill-health. He resumed his practice and took a prominent part in politics, being chairman of the republican state committee in 1868. Shortly after he was appointed minister to Turkey by president Grant. Mr. MacVeagh soon became noted for the independence of his political views, and was an influential member of the young men's reform club of Philadelphia. On Mar. 5, 1881, president James A. Garfield sent in his name to the senate as attorney-general of the new cabinet, and the nomination was confirmed upon the same day.

McVICKAR, JOHN, D.D., 1787–1868; b. N. Y.; educated at Columbia college, and ordained to the ministry of the Protestant Episcopal church. He was rector of St. James's church in Hyde Park from 1811 to 1817, when he was elected professor of moral philosophy, rhetoric, and belles-lettres in Columbia college, where he remained till 1864, when he was made professor emeritus. He published, among other works, *Outlines of Political Economy*, 1831; *Early Years of Bishop Hobart*, 1834; *Professional Years of Bishop Hobart*, 1836.

McWHORTER, ALEXANDER, D.D., 1734–1807; b. New Castle co., Del.; graduated at the college of New Jersey in 1757; studied theology under William Tennent; was installed pastor of the Presbyterian church at Newark, N. J.; went on a mission to North Carolina in 1764; became chaplain in Knox's artillery brigade in 1778; in 1779 became pastor at Charlotte, N. C., and president of Queen's museum college, then called Liberty hall; returned to Newark in 1781; aided in preparing the constitution of the American Presbyterian church in 1788; was 35 years a trustee of the college of New Jersey; labored to collect funds in New England to rebuild his church that had been burnt in 1802; published a centennial sermon in Newark in 1800, and 2 volumes of sermons in 1803.

McWHORTER, ALEXANDER, b. New York, 1822; graduated at Yale college in 1842 and at the divinity school in 1845; was professor of English literature and metaphysics at the university of Troy from 1856 to 1860; author of *Yahveh Christ, or the Memorial Name*. Toward the last of his life his mind was disordered.

MADAGAS'CAR, an island situated to the s.e. of the African continent, and extending over an area larger than the British isles. It is in lat. 11° 57′ to 25° 38′ s., and long. about 43° to 51°; length, 1030 m., greatest breadth, 350 m.; area estimated at 225,000 sq. miles. Although well known to Europeans since the beginning of the 16th c., Madagascar has even now been imperfectly explored. The coasts were surveyed by capt. Owen between 1823 and 1825, and the outline of the island correctly laid down in our maps; but there has hitherto been a great lack of knowledge as to the geography of the interior. Most of the information we possessed was owing to a distinguished French explorer, M. Alfred Grandidier, who, in 1869 and 1870, crossed the island in several directions. Now, however, Dr. Mullens and Mr. Pillans have brought home some beautiful specimens of cartography, from which a new map of Madagascar has been prepared.

M. Grandidier states that Madagascar comprises two distinct parts—the northern, which is mountainous, and the south-western, which is comparatively flat. Five great mountain chains traverse the island, all in a n.n.e. and s.s.w. direction. The three chains farthest to the w. are prolonged southward, and belong to the secondary formation. They have a very sterile soil. The two eastern chains are prolonged northwards, and form a great mountain tract of granitic rocks. They form a rugged region on the eastern slope of the island. From the observations of Dr. Mullens, it is now discovered that the central provinces of Madagascar have been the scene of volcanic phenomena on an immense scale. The Ankárat mountains, forming an extinct volcanic center, cover an area of 600 sq. miles. In a region 25 m. from this range, Dr. Mullens and his companion visited and mapped more than 40 craters. Fifty m. to the s. are three groups of volcanoes. This volcanic belt is continued towards the n., and is evidently connected with that volcanic system of which Comoro is now the active vent. Madagascar has been celebrated for its luxuriant vegetation; but it appears that it is sterile and desolate in the central and south-western parts. In the n. and e. the climate is moist. Magnificent forests clothe the hills. Elsewhere this belt of vegetation forms a narrow skirt along the shore.

The climate is temperate and healthy in the highlands of the interior, but low fever renders the hot sea-coast undesirable as a residence for Europeans. The flora and fauna of Madagascar, although resembling those of Africa, and more remotely of India, are so peculiar as to form a region apart. They comprise many species, and even many genera nowhere else to be found. The number and variety of the *lemuridæ* is a prominent characteristic.

There has been much discussion about the branch of the human family to which the Malagash belong. M. Grandidier believes that three distinct races are to be recognized in the island—namely, the original inhabitants, allied to the negroes; the free inhabitants on the w. coast, resembling the white races; and a third race belonging to the Malay stock. Dr. Mullens believes that the Malagash or Malagasy are a single race of Malay origin, and divides them into three tribes—the Betsimasarakas, the Sakalavas, and the Hovas. He estimates the total pop. at 2,500,000. The Malagash language, spoken all over the island, contains such a number of Malay words that it has been classed with the languages spoken in the Malay peninsula.

The exports of Madagascar are horned cattle, and a small quantity of rice, shipped principally to Mauritius and Bourbon. The island is rich in iron, but the present means of working it are very deficient. At present, the only mode of traveling is in palanquins, borne on the shoulders of men; and the paths by which this simple method of journeying is performed are often so bad as to cause much delay. Madagascar is now divided politically into two nearly equal parts: 1st, that n. of 22° s lat. and e. of 46° e. long., which is dependent on the Hovas; and 2d, the remainder of the island. The first part

is by far the richest and most fertile, and is peopled by seven-eighths of the whole population. The French retain possession of the island of Ste. Marie, on the n.e., and Nossi Be on the n.w. coasts. The capital of Madagascar is Tananarivo, with a pop. of 80,000.

The early history of Madagascar is involved in obscurity. It is supposed to have been known to the ancients, by whom it was generally considered as an appendage to the mainland. When it was invaded and peopled by the Malays, from whom the Hovas descend, is unknown. It was referred to in the 13th c., by Marco Polo as Madgastar or Madaigascar. In 1643 the French took possession of the Ile Ste. Marie, and thus formed a connection with Madagascar which they have ever since retained. It was not till 1810, when Radama I., king of the Hovas, extended his influence over the greater part of Madagascar, that Madagascar became important to the commercial countries of Europe. The English entered into a treaty with him in 1816, and in consideration of his promise of assistance to suppress the slave-trade with Mozambique, English drill-sergeants were sent to him to discipline the native troops. Missionaries had previously established themselves, and by their aid a few English mechanics found the means of introducing useful arts among the inhabitants. With the ostensible object of carrying out his agreement, Radama was furnished with fire-arms for his troops, which he quickly, however, made use of in the reduction of such tribes as yet remained in opposition to his supremacy. Upon the death of Radama, in 1828, he was succeeded by Ranavalo I., a woman whose reign was marked by every cruelty possible to be practiced against the native Christians. She closed the missionary schools, and banished Europeans from the island. In consequence of the outrages to which her orders gave rise in 1845, English and French troops made an attack on Tamatave, the usual trading port on the east coast, but without any satisfactory result. In 1862 the queen died, and her son was proclaimed king under the title of Radama II. He concluded a treaty granting concessions of territory to M. Lambert, a French merchant acting in the name of France. A conspiracy was formed against the king, and he was strangled in 1863. His wife, Rosaherina, then ascended the throne. The change was favorable to English as opposed to French interests in the island. In 1865 treaties were concluded with England and America, while that which M. Lambert had negotiated was declared null. On the death of Rosaherina, disputes again broke out as to a successor, between the native or Hova and the European parties. With the aid of the prime minister, Rainitaiarivoy, a female relation of the late queen, was raised to the throne, under the name of Ranavalo II. She showed great favor to the Protestant missionaries, had herself instructed in the Christian religion, and on Feb. 21, 1869, she, the prime minister, whom she had married, and a large number of the nobility, were baptized. Towards the close of the year, a body of mounted officers, by order of the government, set fire to the Kalimalaza, the chief idol, and the temple in which it stood. The destruction of other idols followed. The effect was most favorable to the Protestant missionaries.—See *History of Madagascar* (Lond. 1838); *Three Visits to Madagascar* (Lond. 1858); and *Madagascar Revisited*, 1867, by the rev. W. Ellis; *Voyage à Madagascar*, by Ida Pfeiffer (Paris, 1862); *Histoire physique naturelle, et politique de Madagascar*, by Grandidier (vol. i. Par. 1876); *L'Ile de Madagascar*, by E. Blanchard; and *Twelve Months in Madagascar*, by Joseph Mullens, D.D. (1875).

MADAME (plural, *Mesdames*), the French word or title of respect and honor formerly applied exclusively to ladies of high rank, but now employed in addressing all married ladies. It is derived from the two French words *ma*, my, and *dame*, lady. In nearly every country in Europe and in the United States, it has come into use to distinguish married from unmarried ladies; and it is certainly a better word than the old English title of mistress, which we abbreviate to Mrs. and mispronounce missis. The French consider it a mark of respect to address ladies whose condition, whether married or unmarried, is not known, by the title of madame. Though the regular plural is *mesdames*, there are many phrases in French which permit the use of *madames* and *madame* in the plural: as "The Mrs. Smiths were numerous there," would be translated—*Les madame Smith y étaient nombreuses.* "There are many ladies without a gentleman," would be expressed by—*Il ya bien de madames sans messieur.* The word lady alone would be expressed in French simply by *dame*, and not *madame*, except when personally addressed, either orally or in writing, when the prefix *ma* is invariably added

MAD-APPLE, a name sometimes given to the apple of Sodom (*solanum Sodomeum*), sometimes to the fruit of the egg-plant (q.v.), and sometimes to the large galls (q.v.) known as *Mecca* or *Bussorah galls*, and which are also called apples of Sodom.

MADAR'. See MUDAR, *ante*.

MADAWAS'KA, a co. in n.w. New Brunswick; 1500 sq.m.; traversed by branches of the St. John, which separates it from Maine on the s.w.; was formerly part of Victoria co. The surface is hilly but fertile.

MADDALO'NI, a city of southern Italy, in the province of Caserta, 14 m. n.n.e. of Naples. Pop. 17,798. It stands in a finely irrigated and fertile district, and enjoys a most salubrious climate. It is an industrious and thriving place, with several fine palaces and churches. It is now connected by railway with Naples and Gaeta.

MADDEN, Sir FREDERICK, 1801–73; b. Portsmouth, Eng.; entered the service of the British museum in 1826 as a cataloguer; two years later was made assistant-keeper of the department of manuscripts, and in 1837 became keeper of the department. He was made a knight of the Hanoverian order by king William IV. in 1832, and in 1834 was gazetted one of the gentlemen of the privy chamber. He continued to hold his post in the British museum until 1866, when he retired; the remainder of his life was devoted to antiquarian and literary study. He edited for the Roxburghe club the metrical romance of *Havelok the Dane;* he also edited *Layamon's Brut, or Chronicle of Britain; Illuminated Ornaments Selected from MSS. and Early Printed Books from the 6th to the 7th centuries;* and other works.

MADDEN, RICHARD ROBERT, b. Dublin, 1798; studied medicine, and was a fellow of the royal college of surgeons. His life has been passed in various official positions in the civil service, the latter part of it as secretary to the loan fund board in Dublin castle. He is best known as a fertile and versatile writer of biography, fiction, travels, history, etc. His principal works are *The Infirmities of Genius; Shrines and Sepulchres of the Old and New World; The Life and Martyrdom of Savonarola; The Turkish Empire in its Relations with Christianity and Civilization;* and *The United Irishmen of* 1798.

MADDER, *Rubia,* a genus of plants of the natural order *rubiaceæ,* very nearly allied to the genus *galium* or bed-straw (q.v.), and differing from it chiefly in having a juicy fruit resembling two small berries growing together. The species are found in the tropical and warmer temperate parts, both of the old and new worlds, and are important for the coloring matter of their roots. The most important is the COMMON MADDER or DYER'S MADDER (*R. tinctorum*), a native, probably, of the s. of Europe as well as of Asia; and now very extensively cultivated in most European countries, and also in the East Indies, China, etc. It is a perennial, with weak stems and whorls of 4–6 elliptic or lanceolate glossy leaves, the stem and leaves rough with sharp prickles; small greenish-yellow flowers, and black fruit. Munjeet (q.v.), or INDIAN MADDER (*R. munjista* or *cordifolia*), ranks next to it in importance. The roots of *R. peregrina* and *R. lucida* are also used in some parts of the Levant. *R. peregrina* is found in the s.w. of England, and is called WILD MADDER. It is very similar to *R. tinctorum.* The roots of *R. relbun* and *R. Chilensis* are used in Chili and Peru.

There is no material of greater importance to dyers than madder (*R. tinctorum*), not only from the great beauty of the colors obtainable from it, but also from the ease with which it can be worked, and the great variety of its applications. Although the madder plant thrives best in warm climates, it may be, and is successfully cultivated in northern districts. The Dutch province of Zeeland has long been celebrated for the large crops of madder produced there; and until about 40 years since, our dyers rarely used any other than Dutch madder, which was always sent ground and packed in large casks; but with the improvements in dyeing, it was discovered that the roots grown in warmer localities possessed not only much superior qualities, but could be made to produce other and more beautiful shades of color. Besides a genial temperature, madder requires a rich, deep soil and careful cultivation. It is usually propagated by cuttings or by shoots from the stocks of old plants; these are set about a foot apart, and in rows, 3 ft. from each other; the planting takes place in spring; and sometimes the roots are lifted at the usual harvest-time for madder (Oct. or Nov.). In France and Germany the markets are supplied with one-year-old (called by the Germans *röthe*), 18 months old, and three years old, which is the best, and called by the Germans *krapp,* or madder *par excellence.* The roots are carefully raised with forks, to prevent breaking them as much as possible; and after the soil is thoroughly shaken off, they are dried in stoves, and afterwards thrashed with a flail to remove the loose skins and any remaining soil still adhering; they are then cut, or broken in pieces, and packed for sale, or they are sent to the mills to be ground. In Turkey and Italy, where the solar heat is great, the stove is dispensed with, the roots being dried in the sun. The more the roots are freed from the epidermis, the better the quality of the madder; hence, before it is ground in France, many manufacturers employ mechanical means, chiefly sieves worked by machinery, which rub off and separate the soft, dark-brown skin which covers the roots; this process is called *robage.* One-year-old roots cannot be profitably dressed in this way, and are therefore ground with the epidermis. Much of the inferior Dutch madder is also ground without dressing, and such is called *mull* in trade. The grinding is effected in mills with vertical stones, and the meal is passed through sieves of different degrees of fineness, which gives rise to various qualities in the market. These qualities are numerous, and have special marks to distinguish them, well known to merchants, but are of no general interest. The madder from Turkey and from India never comes to us ground; the roots are merely broken up into pieces an inch or two in length, and packed in bales. Very small quantities of madder occasionally reach us from Russia; it is the produce of the government of Baku, on the Caspian sea, and is said by our dyers to be the finest in the world.

As might be expected of a substance of such vast commercial and manufacturing value, madder has undergone the most elaborate chemical researches. Its dyeing quality has been known for at least 2,000 years, and its medicinal qualities are also mentioned by Pliny and Dioscorides. The former writer, referring to its value as a dyeing

material, says: "It is a plant little known except to the sordid and avaricious, and this because of the large profits obtained from it, owing to its employment in dyeing wool and leather. The madder of Ravenna was, according to Dioscorides, the most esteemed. Its cultivation in Italy has never been discontinued; and under the present enlightened government it has received such an impetus that the exports of the Neapolitan provinces alone, in one year, exceeded in value a quarter of a million sterling. It was about the beginning of the present century that the coloring matter of madder began to attract very especial attention. It had long before been noticed that cattle which used the green parts of the plant as fodder had a red color communicated to their bones, which was only removed by discontinuing this kind of food for a considerable time. This showed the coloring matter to be capable of isolation; dyers also began to suspect that the color produced was a combination of two—one red, and the other a purplish brown. But Roubiquet, a French chemist, about 1820, demonstrated that madder contains two distinct colors, capable of being isolated and used separately; he called them alizarine and purpurine; the former, he asserted, gave the bright red, and the latter the purple red colors. Practically, Roubiquet's statement may be held to be correct; but the recent and more elaborate researches of Dr. Schunck, of Manchester, have shown the composition of madder to be very complicated indeed. At the meeting of the British association in 1861 he showed the following chemical principles, all obtained from this remarkable root: 1. Rubianine; 2. Rubianic acid; 3. Rubianite of potash; 4. Purpurine; 5. Chlorrubian; 6. Pthalic acid; 7. Alizarine; 8. Rubiadine; 9. Chlorrubiadine; 10. Rubiafine; 11. Rubiacine; 12. Rubian; 13. Verantine; 14. Perchlorrubian; 15. Rubiagine; 16. Grape-sugar; and 17. Succine. Within the last three years, artificial alizarine has been produced, and is now extensively used by dyers. It is one of the numerous series of aniline colors.

Dyers employ madder for giving the celebrated Turkey-red to cotton goods, and for this purpose employ means for developing the alizarine; and for purples, lilacs, and pinks, which are obtained by means of the purpurine. Manchester, Glasgow, Paisley, Alexandria, and other places on the banks of the Clyde, are the chief seats of this industry; the imports of madder into Britain in 1875 amounted to 126,152 cwt., amounting in value to the sum of £410,993.

MADDER-LAKE, a painter's color, made from madder, by boiling it in a solution of alum, then filtering the liquid, and adding sufficient carbonate of soda to cause precipitation of the alizarine or red coloring matter of the madder, which alone has been dissolved by the boiling solution of alum. This lake is used either as an oil or water color.

MADEI'RA, an island in the n. Atlantic ocean, off the n.w. coast of Africa, from the nearest point of which it is 390 m. distant, in lat. 32° 43′ n., long. 17° west. It lies 280 m. n. of Teneriffe, in the Canaries, and 620 m. s.w. of Lisbon. Madeira and the other islands of the group form a province of Portugal, with an area of 345 sq.m., and pop. '72, 115,000—including the adjoining small island of Porto Santo—of whom 186 are English resident. It has been compared, in appearance, to the island of Arran, in the Firth of Clyde, but is wilder and grander. Its coasts are steep and precipitous, rising from 200 to 2,000 ft. above sea-level, comprising few bays or landing-places, and deeply cut at intervals by narrow gorges, which give to the circumference the appearance of having been *crimped*. From the shore, the land rises gradually to its highest point, the Pico Ruivo, 6,050 ft.; there are several other peaks upwards of 4,000 ft. high. It is remarkable for its deep valleys, the most noted being that of "Curral," which from brink to bottom has a depth of 2,060 feet. Madeira is of volcanic origin, and slight earthquakes sometimes, though rarely, occur. The lower portions of the island abound in tropical plants, as the date-palm, banana, custard-apple, mango, sweet-potato, Indian corn, coffee, sugar-cane, pomegranate, and fig. The fruits and grains of Europe are cultivated to an elevation of 2,600 ft. above the sea-level, and the vine and sugar-cane on the lower grounds; above these are found timber (including the chestnut, whose fruit is used extensively by the inhabitants as food), pine (*pinus maritima*) used as fuel, fern, grass, and heath, and the scant herbage of alpine regions. Madeira produces 80 or 90 plants peculiar to itself, but the flora in its general characteristics resembles that of the countries around the Mediterranean sea. The grape disease has, within recent years, been almost universal, and wine has not been made in such quantity as formerly. Madeira has no indigenous mammalia, but the ordinary domestic animals, together with rabbits, rats, and mice, have been introduced by the Portuguese. The climate is remarkable for its constancy. There are only 10° difference between the temperatures of summer and winter, the thermometer in Funchal (the capital of the island) showing an average of 74° in summer, and of 64° in winter. At the coldest season, the temperature rarely is less than 60°, while in summer it seldom rises above 78°; but sometimes a waft of the *lesté*, or e. wind, rises it to 90°. The temperate and constant warmth of its climate has made it a favorite resort for invalids affected by pulmonary disease. Besides the English church, there are other places of worship, including a Presbyterian church in connection with the Free church of Scotland. The educational institutions comprise the Portuguese college and Lancasterian and government schools. Funchal (q.v.) is the port of the island. In 1877, 619 vessels, chiefly British, of 437,823 tons,

entered and cleared the port. The imports in 1877, consisting chiefly of cotton, woolen, and linen manufactured goods, iron, flour, earthenware, Indian corn, rice, oil, and timber, amounted to £276,327; the exports for the same year, consisting of wine, sugar, citron, embroidery, and wicker-work, coal, salt-beef, and hides, amounted to £232,656. The vintage of 1877 was scanty, only yielding about 6,000 pipes of wine. The sugar-cane crop yielded about 667 tons of sugar, and 240,000 gallons of spirits. The trade is chiefly with Great Britain.

The inhabitants of Madeira are of mixed Portuguese, Moorish, and negro descent; they are of vigorous frame, lively and industrious, but totally uneducated. Madeira was formerly covered with forests, whence its name—the Portuguese word *madeira* signifying timber. The group to which this island belongs, sometimes called the northern Canaries, was discovered in 1416, and was shortly afterwards colonized by the Portuguese. (Compare White's *Madeira, its Climate and Scenery*.)

MADEIRA, or MADERA, or CAYARA, an important river of Brazil, South America, and an affluent of the Amazon, has its origin in the confluence of several rivers, the chief of which are the Beni, Mamore, Madalena, and Stanez, in lat. about 10° south. It has a n.e. course of 700 m., for the last 500 m. of which it is navigable, the remaining 200 being obstructed by numerous cataracts; and it falls into the Amazon in lat. 3° 25′ s., long. 59° 45′ west. Including the Mamore, the entire length is about 1500 miles.

MADEIRA NUT, the fruit of the *Juglans regia*, a large timber tree. It is an edible nut, popularly known as the English walnut. A drying oil, of much value in the manufacture of varnishes, is made from its kernel.

MADEIRA WINE is produced on the Portuguese island of Madeira in the Atlantic ocean. The introduction of vines dates from 1421, and wine was until within recent years exported in large quantities. The valley of the Cama de Lobos became known for its excellent Malmsey wine, besides which the dry Maderia, the sercial, and the *tinto* were much sought after. The grapes are almost all white, and ripen in the shade of trellises, where they are allowed to become half dry before being gathered. It is said that they all come from stocks which were brought from Candia in 1445. The principal wine growers are Englishmen, as Madeira wine has always been consumed in large quantities in England. There is an enormous proportion of wine, manufactured in Europe, sold as genuine Madeira, which, together with the destruction of the vines by the *oidium*, reduced the production from 22,000 pipes in 1813 to 3,000 in 1844; in consequence of which many of the inhabitants have emigrated to the West Indies and Guiana. From 1847 to 1855 the vintages decreased as follows: 1847-50, 16,000 pipes; 1851, 12,000; 1852, 1000; 1853, 754; 1854, 187; 1855, 29. In 1857, however, the sulphur remedy was tried with great success, and a decided improvement was noticed in the wine production of 1861. At the present time there are favorable signs that the vintage of Madeira may, with judicious cultivation, reach its former prosperity.

MADHAVA is an apellation of the Hindu god Vishnu (q.v.), one by which he is very frequently designated in Hindu mythology and in Sanskrit poetry.

MÂDHAVÂCHÂRYA (i.e., *Mâdhava*, the Achârya, or spiritual teacher) is one of the greatest Hindu scholars and divines that graced the mediæval literature of India. He is famed for his numerous and important works relating to the Vedic, philosophical, legal, and grammatical writings of the ancient Hindus, and also for his political connection with the history of some renowned kings of the Deccan. His learning and wisdom were so eminent, that he was supposed to have received them from the goddess Bhuvaneswarî, the consort of Siva, who, gratified by his incessant devotions, became manifest to him in a human shape, conferred on him the gift of extraordinary knowledge, and changed his name to Vidyâranya (the forest of learning), a title by which he is sometimes designated in Hindu writings. All the traditions about Mâdhavâchârya, however differing from one another, agree in ascribing the origin of Vijayanagara to Mâdhava. His birthplace is said to have been Pampa, a village situated on the bank of the river Tungabhadrâ; and as all the accounts of his life admit his having been the prime minister of Sangama, the son of Kampa, whose reign at Vijayanagara commenced about 1336, and to have filled the same post under king Bukka I., who succeeded Harihara I. about 1361, and as he died at the age of ninety, the date of his birth coincides probably with the beginning of the 14th century. Among his works, the principal are his great commentaries on the Rig-, Yajur-, and Sâma-veda (see VEDA); an exposition of the Mîmânsâ philosophy; a summary account of fifteen religious and philosophical systems of Indian speculation; some treatises on the Vedânta philosophy; another on salvation; a history of Sankara's (q.v.) polemics against multifarious misbelievers and heretics; a commentary on Parâs'ara's code of law; a work on determining time, especially in reference to the observation of religious acts; and a grammatical commentary on Sanskrit radicals and their derivatives. The chief performance of Mâdhava is doubtless the series of his great commentaries on the Vedas, for without them no conscientious scholar could attempt to penetrate the sense of those ancient Hindu works. In these commentaries, Mâdhava labors to account for the grammatical properties of Vedic words and forms, records their traditional sense, and explains the drift of the Vedic hymns, legends, and rites. That in an undertaking almost unparalleled, in the literary history of any nation,

for its magnitude and difficulty, Mâdhava should have committed sundry inaccuracies —the remedy against which, however, is really always afforded by himself—can surprise no one; but when modern Sanskrit philology affords the spectacle of writers haughtily exaggerating these shortcomings, and combining with their would-be criticisms the pretense of establishing the true sense of the Vedas without the assistance of Mâdhava, a mere comparison of the commentary of the latter with what the European public is called upon to accept as its substitute, adds a new testimony to the vast superiority of the Hindu scholar over his European antagonists. See VEDA. Some of Mâdhava's works seem to have been lost.

MADHU'CA. See BASSIA.

MA'DIA, *Madia,* a genus of plants of the natural order *compositæ,* sub order *corymbiferæ,* having seeds without pappus, the outer ones situated between the leaves of the involucre, the flowers yellow, the exterior ones rather shortly ligulate, those of the disk tubular. The plants of this genus are annual, of upright habit, rough with glandular hairs, and very viscid; they are important on account of the utility of the seeds as a source of vegetable oil. *M. sativa,* a native of Chili, is there called *madi* or *melosa,* and is generally cultivated as an oil plant. It is 3 to 5 ft. high, has ovato-lanceolate, entire leaves; the flowers terminal, and crowded upon the leafy branches. It has been known in Europe since the beginning of the 19th c., but first began to be cultivated in fields as an oil-plant in 1839. The results of experiments in its cultivation have not, however, in most cases been so favorable as was expected; yet it deserves attention, as it is only annual, does not suffer from frost, does not demand a very good soil, and produces an excellent oil. Madia oil is richer than poppy oil, almost entirely inodorous, of a bland, agreeable taste, and very suitable for oiling machines, as it does not freeze even at a cold of 10° F. The oil-cake is a good food for cattle. The straw and chaff have poisonous properties. It is, however, a great disadvantage that the flowers ripen gradually in succession, so that the first are already fallen off when the last are not yet ripe. The cultivation of *M. sativa* has not yet been attempted on a considerable scale in Britain. —Another species, *M. elegans,* is cultivated in flower-gardens.

MADISON, a co. in n. Alabama, having the state line of Tennessee for its n. boundary, and the Tennessee river for its s., is drained by the Flint river, emptying into the Tennessee; 800 sq.m.; pop. '80, 37,625—37,433 of American birth, 19,033 colored. Its surface is undulating, rising in the n. into high hills, and in the s. stretching into wide fertile prairies. It has a large proportion of tillable land, as well as extensive forests. Its soil, with a limestone foundation, is fertile, and produces live stock, every kind of grain, tobacco, cotton, wool, sorghum, and sweet-potatoes. In '70, it produced 6,334 lbs. of honey. Cash value of farms in '70, $2,194,834, numbering 2,758. It had in '70, 93 manufacturing establishments, including foundries, manufactories of sashes and blinds, carriages and wagons, cotton goods, flour and saw mills, employing 449 hands, with a capital of $167,440, and an annual product of $501,096. It is intersected by the Memphis and Charleston railroad. Seat of justice, Huntsville.

MADISON, a co. in n.w. Arkansas, having a range of the Ozark mountains for its s. boundary, is drained by the War Eagle, King's river, and the Main Fork, all branches of the White river; 750 sq.m.; pop. '80, 11,455—11,439 of American birth, 124 colored. Its surface is mountainous. Groves of oak, chestnut, pine, and fir grow on the hill sides, in which are found deposits of iron ore, marble, and limestone. The products of its soil are adapted to the raising of live stock; oats, corn, rye, wheat, tobacco, wool, sweet-potatoes, honey, sorghum, and flax are cultivated. Seat of justice, Huntsville.

MADISON, a co. in n. Florida, having the state line of Georgia for its n. boundary, lake Micosuki for its extreme n.w., and the Withlacoochie river, a branch of the Suwanee, for its e. border; 750 sq.m.; pop. '80, 14,798—14,773 of American birth, 9,190 colored. It is also drained by the Ocilla river, forming its s.w. boundary and emptying into Appalachee bay. Its surface is uneven and broken, and largely covered with forests of good building timber, which is an article of export. Its soil, near the water courses, is fertile and suited to the production of live stock, oats, corn, cotton, wool, sweet-potatoes, and sugar-cane. It had in '70, 16 manufacturing establishments, mostly lumber and grist mills, and machine shops, employing 96 hands, with a capital of $75,900, and an annual product of $102,825. It is intersected centrally by the Jacksonville, Pensacola and Mobile railroad. Seat of justice, Madison.

MADISON, a co. in n.e. Georgia, having branches of the Broad river of Georgia for its s. and e. boundary; 400 sq.m.; pop. '80, 7,978—7,973 of American birth, 2,586 colored. Its surface is hilly and two-thirds covered with a dense growth of timber. Granite, gold, and iron are its mineral products. In some localities there are mineral springs of great medicinal value; and its soil, partly fertile, is adapted to the raising of cattle, sheep and swine, oats, corn, wheat, cotton, wool, and sweet-potatoes. Seat of justice, Danielsville.

MADISON, a co. in s.w. Illinois, having the Mississippi river for its w. boundary, separating it from Missouri; the Missouri river emptying into the Mississippi in its vicinity; 750 sq.m.; pop. '80, 50,141—38,518 of American birth. It is drained by

Cahokia creek, and numerous small creeks and rivulets. Its surface is generally level, with well wooded elevations in the w. part, on which elm, walnut, linden, and maple trees are found, as well as oak, hickory, and ash. Its soil is fertile, and rests on strata of carboniferous limestone and bituminous coal, which appears in largest quantities at Alton. Coal, lime, and building stone are exported. It is traversed by the Indianapolis and St. Louis railroad, and the St. Louis, Vandalia and Terre Haute. The Jackson division of the Chicago and Alton railroad forms a junction with the main line in the n.w. section, and its county seat is the s.w. terminus of the Chicago and Alton railroad on the Indianapolis and St. Louis, and the St. Louis, Rock Island and Chicago railroad. It produces every variety of grain, tobacco, wool, sweet-potatoes, sorghum, and the products of the dairy. Its manufacturing product in '70 was $4,794,490. There are flour and lumber mills, carriage factories, plow factories, bell factories, cigar factories, breweries, foundries, woolen-mills, distilleries, manufactories of church organs, and brick-yards. Lime is manufactured; also cement, agricultural implements, plug tobacco, tin, copper, and sheet-iron ware. It had in '70, 15 coal mines. Seat of justice, Edwardsville.

MADISON, a co. in e. Indiana, drained by Fall creek, Pipe creek, and the head waters of the East and West Forks of White river; 475 sq.m.; pop. '80, 27,531—26,877 of American birth. It is traversed by the Cleveland, Columbus, Cincinnati and Indianapolis railroad; the Columbus, Chicago and Indiana Central; the Lafayette, Muncie and Bloomington; the Pittsburg, Cincinnati and St. Louis; and the Cincinnati, Wabash and Michigan, with junctions at Alexandria, Elwood, and Anderson. Its county seat is the terminus of the Anderson, Lebanon and St. Louis railroad. Its surface is generally level, and partially covered with a dense growth of building timber. Its soil is calcareous and very fertile, producing buckwheat, barley, oats, rye, wheat, tobacco, wool, wine, fruit, sorghum, and maple sugar. It produced in '70, 1,028,150 bushels of corn, and 12,110 lbs. of honey. Its extensive water power is utilized by flour, lumber mills, etc., and among its manufactures are carriages, staves and headings, chairs, engines, furniture, sashes and blinds, agricultural implements, saddlery and harness, and woolen goods. It had in '70, 127 manufacturing establishments, employing 446 hands, with a capital of $377,807, and an annual product of $829,250. Cash value of farms in '70, $9,399,441, numbering 2,288. Value of live stock in '70, $1,229,996. Limestone is quarried. Seat of justice, Anderson.

MADISON, a co. in central Iowa, drained by Middle river, and other branches of the river Des Moines, and by the head waters of the Grand river; 576 sq.m.; pop. '80, 17,225—16,460 of American birth, 11 colored. Its surface is rolling, with a large proportion of fertile prairie, much tillable bottom land, and excellent grazing country, containing beds of bituminous coal. Its products are fruit, and all kinds of grain, tobacco, wool, dairy products, hops, flax, maple sugar, sorghum, and honey. Among its manufactories are woolen-mills, grist-mills, and plow factories. The Chicago, Rock Island and Pacific railroad forms a portion of its n.w. boundary, and the Indianola and Winterset branch of that road terminates at its county seat. Seat of justice, Winterset.

MADISON, a co. in e. Kentucky, having the Kentucky river for its n. boundary; drained by Silver creek and other streams; 450 sq.m.; pop. '80, 22,051—21,936 of American birth, 7,290 colored. Its surface is uneven and thinly timbered. Its calcareous soil is suited to the raising of cattle, sheep, and swine, every kind of grain, tobacco, wool, sweet-potatoes, sorghum, and maple sugar. It produced in '70, 5,835 galls. of wine, and 4,715 lbs. of honey. Cash value of farms in '70, $8,981,032, numbering 1,592. Value of live stock in '70, $1,948,277. It had in '70, 103 manufacturing establishments, employing 302 hands, with a capital of $286,375, and an annual product of $707,169; consisting of flour and saw mills, woolen-mills, manufactories of stone ware, of carriages and wagons, of saddlery and harness, plow factories, and distilleries. Seat of justice, Richmond.

MADISON, a parish in n.e. Louisiana, having the Mississippi river for its e. boundary separating it from the state of Mississippi, and the navigable Tensas river, a confluent of the latter, for its w. boundary; also drained by the Macon bayou; 600 sq.m.; pop. '80, 13,908—13,754 of American birth, 12,657 colored. Its surface is mostly level and low, with large forests of cypress and the kinds of trees generally found in the gulf states. The alluvial soil along the water courses is very fertile, and produces corn, cotton, and sweet-potatoes. Cash value of farms in '70, $1,757,403, numbering 1,543. Value of live stock in '70, $355,598. It is intersected centrally by the Vicksburg, Shreveport and Texas railroad. Seat of justice, Delta.

MADISON, a co. in central Mississippi, having the Big Black river for its s.w., w., and n.w. boundary, and the Pearl river for its e., s.e., and n.e. boundary; intersected centrally by the Chicago, St. Louis and New Orleans railroad; 650 sq.m.; pop. '80, 25,866—25,672 of American birth. Its surface is composed of fertile prairies extending on all sides into rich plains, dotted here and there with groves of timber, growing on the fine bottom land of the river banks. Its county seat is a thriving cotton mart. Its soil is adapted to the raising of cattle and sheep, and produces, tobacco, cotton, wool, sweet-potatoes, the products of the dairy, oats, corn, and wheat. It produced in '70, 5,786

lbs. of honey. Cash value of farms in '70, $2,907,357, numbering 704. Value of live stock in '70, $840,606. Seat of justice, Canton.

MADISON, a co. in s.e. Missouri, drained by Castor creek and the head waters of the St. Francis river; intersected in the n.e. portion by the St. Louis, Iron Mountain and Southern railroad; 440 sq.m.; pop. '80, 8,860—8,506 of American birth, 308 colored. Its surface is hilly and well timbered, with a foundation of limestone, and containing beds of iron and lead ore, nickel, copper, gold, platinum, and silver. Its soil is adapted to the production of live stock, fruit, every variety of grain, tobacco, wool, sweet-potatoes, dairy products, honey, maple sugar, and sorghum. It had in '70 an annual manufacturing product of $77,785. It has steam flouring mills, breweries, lumber mills, railroad repair-shops, and smelting furnaces. Its lead mines in the extreme n.e. section have been worked for more than 100 years, and in the vicinity cobalt, malachite, and other minerals are found. Seat of justice, Fredericktown.

MADISON, a co. in s.w. Montana, having a range of the Rocky mountains for its s. boundary separating it from Idaho; drained in the e. portion by the Madison river running n., in the w. by the Beaver Head, Wisdom, and Passamari creeks which unite to form the Jefferson fork of the Missouri; about 5,100 sq.m.; pop. '80, 3,916—2,890 of American birth, 294 colored. It is a fine agricultural and rich mining district, and an excellent grazing country. The mountains, deep divides, and cañons present scenery of great beauty and grandeur. It is in close proximity to the national park and the valley of the Yellowstone river. Groves of evergreen trees grow on the foot-hills and along the river bottoms. The agricultural products of its valleys are barley, oats, rye, wheat, and live stock. Its principal industries are hydraulic, placer, and quartz mining; and in '70, it had 15 hydraulic gold mines, 10 placer mines, and 8 quartz mines. Whole number of hands employed 219, aggregate capital $672,800, with an annual product of $216,416. Valuable silver mines are found near the Madison river, and are still attracting prospecting parties. Granite and silurian limestone underlie this region, and basalt, feldspar, gneiss, galena, and serpentine are found; also, in the vicinity of the county seat, hot springs with valuable medicinal properties. In the extreme s.e. is Sawtelle's peak, an extinct volcano composed of porphyry, basalt, etc. With the exception of the Utah Northern railroad, extending some distance n. of Red Rock in the s. portion, the transportation is by wagon and coach over roads along the mountain side built at great expense; and the vast amount of freight following the progress of the railroad proves the rapid settlement of the country. Seat of justice, Virginia City.

MADISON, a co. in w. North Carolina, having the Iron or Great Smoky mountains for its n. boundary separating it from Tennessee, is watered by the French Broad river; 450 sq.m.; pop. '80, 12,810—12,798 of American birth, 457 colored. Its surface is hilly and principally covered with a thick growth of timber. It contains mineral deposits of great value. Its soil is adapted to the raising of live stock, tobacco, buckwheat, oats, corn, rye, wheat, wool, sugar-cane, flax, sweet potatoes, and the products of the dairy. It produced in '70, 20,209 lbs. of honey. Its scenery presents many attractive features, notably where the French Broad river flows through a gorge of the Smoky mountains, near the celebrated Warm springs of North Carolina, and the slopes of Bald mountain rise in the extreme n.e., 5,552 ft. above the level of the sea. Seat of justice, Marshall.

MADISON, a co. in n.e. Nebraska, drained by the Elkhorn river and its north branch in the n. section, and by Taylor creek in the s.; 576 sq.m.; pop. '80, 5,589—4,136 of American birth, 6 colored. Its surface is rolling and thinly timbered. Its soil is adapted to stock raising and the production of grain, wool, dairy products, and sorghum. Its water-power is utilized to some extent, and it has a U. S. land agency. Seat of justice, Madison.

MADISON, a co. in s.w. Ohio, drained by Paint creek, Deer creek, Darby creek, and other tributaries of the Scioto river; 440 sq.m.; pop. '80, 20,129—18,841 of American birth, 1078 colored. Its surface is generally level and thinly timbered. Its soil is suited to the raising of tobacco, wool, wine, dairy products, fruit, sorghum, flax, hops, and all kinds of grain. It produced in '70, 11,683 lbs. of honey. Cash value of farms in '70, $10,713,942, numbering 1263. Value of live stock in '70, $1,644,404. It is traversed by the Cincinnati, Sandusky and Cleveland, the Pittsburg, Cincinnati and St. Louis railroads, the Little Miami railroad, and the Springfield Southern. Flour and carriages and wagons are manufactured. It had in '70, 117 establishments, employing 328 hands, with a capital of $175,316 and an annual product of $405,806. Seat of justice, London.

MADISON, a co. in central New York, having Oneida lake, 20 m. long and 6 m. wide, for its n. boundary; drained by Oneida creek, the Chenango river, the Unadilla river on its s.e. border, the Chittenango river on the s.w., and the Canastota emptying into Oneida lake; also by Cazenovia lake, 3 m. long, in the w. section; 650 sq.m.; pop. '80, 44,372. Its surface is low and uneven, well wooded, in some portions swampy, in others sinking into deep, narrow valleys. Sugar-maple, ash, and oak trees grow in profusion. Its soil has an underlying formation of Niagara limestone and Onondaga limestone, and stone which is quarried for building purposes. Gypsum and water-lime are found, and saline sulphur springs. Hops are exported, the yield in '70 being

3,232,925 lbs. Its productions include every variety of grain, tobacco, maple-sugar, wool, Irish potatoes, and an enormous dairy product. It produced in '70, 8,389 lbs. of honey. Cash value of farms in '70, $26,568,018, numbering 4,140. It had in '70, 736 manufacturing establishments, employing 2,488 hands, with a capital of $2,149,286, and an annual product of $4,798,371. Its leading industries are the manufacture of carriages, wagons, flour, brick, cheese, leather, agricultural implements, lumber, cooperage, steam engines, optical and astronomical instruments, pocket cutlery, boxes, furniture, water-lime, lime, cotton, silk, and woolen goods, ship-building and repairing. It has distilleries, foundries, and knitting-mills. It is intersected by the New York Central and Hudson River railroad and the Utica, Clinton and Binghamton, with their branches, the Cazenovia, Canastota and De Ruyter railroad; the Erie canal and the Chenango canal, connecting Utica with Binghamton, following the course of the Chenango river in the s.e. section. Seat of justice, Morrisville.

MADISON, a co. in w. Tennessee, intersected centrally by the Chicago, St. Louis and New Orleans, and the Mobile and Ohio railroads, forming a junction at Jackson; watered by the Middle fork of Forked Deer river, forming its n. boundary; 600 sq.m.; pop. '80, 30,874—30,632 of American birth, 15,465 colored. It is drained by the South fork, flowing diagonally through it, and its generally level surface is well wooded with groves of the tulip tree, beech, and ash, and forests of oak, hickory, and walnut. Its soil is fertile, producing oats, corn, rye, wheat, cotton, wool, sweet potatoes, dairy products, and honey. Cash value of farms in '70, $3,953,675, numbering 1547. Value of live stock, $956,719. Cotton is exported. Among its manufacturing establishments are tanneries, iron foundries, and railroad repair shops, flour and lumber mills, numbering in '70, 107, employing 392 hands, with a capital of $137,265, and an annual product of $370,022. Seat of justice, Jackson.

MADISON, a co. in s.e. Texas, having the Trinity river for its e. boundary, and the Navasota river for its w., is drained by numerous rivulets emptying into them; 550 sq.m.; pop. '80, 5,395—5,351 of American birth, 1703 colored. Its surface is undulating and well wooded with oak, pine, and other building timber. Its soil is fertile; products are live stock, corn, tobacco, cotton, wool, sweet potatoes, wine, honey, and sorghum. Seat of justice, Madisonville.

MADISON, a co. in n. Virginia, having the Blue Ridge mountains for its n.w. boundary, is bounded on the s., s.e., and s.w. by the Rapidan river, and drained by Oriskany creek and Robertson's and Hazel rivers; 280 sq.m.; pop. '80, 10,562—10,551 of American birth, 4,557 colored. Its surface is mountainous, and presents features of great natural beauty, attracting many tourists. A large proportion of the land is covered with forests of hard wood. Its soil is fertile in some sections, and produces live stock, hops, tobacco, wool, sweet potatoes, dairy products, honey, sorghum, oats, corn, rye, and wheat. Cash value of farms in '70, $1,753,087, numbering 489. It had it '70, 42 manufacturing establishments, employing 85 hands, with a capital of $35,950 and an annual product of $108,960; represented by cheese factories, tanneries, etc. Seat of justice, Madison Court-House.

MADISON, a city of Indiana, on the Ohio river, founded in 1808, lies 100 m. w.s.w. of Cincinnati. It is finely situated on an elevated, plateau, with a background of hills; has a court-house, 2 markets, 3 banks, 15 churches, cotton, woolen, and iron factories, several flouring-mills, large pork-packing establishments, and a flourishing trade. Pop. '70, 10,709.

MADISON (*ante*), a city in s.e. Indiana, the terminus of one branch of the Jeffersonville, Madison and Indianapolis railroad; pop. '70, 10,709. It is delightfully located 45 m. n. of Louisville, 86 m. s.e. of Indianapolis, and 45 m. s.e. of Columbus. The hills at the n. are 400 ft. high, overlooking the valley 3 m. in length. It is regularly and substantially built, lighted with gas, and abundantly supplied with water by an aqueduct. Its brick-yards furnish a large proportion of the building material. It has several public halls, a public library of 4,000 vols., excellent public schools, 2 national banks and a state bank, with an aggregate capital of $650,000. It supports 1 daily, 1 semi-weekly, and 2 weekly newspapers, and is accommodated by a daily line of steamers plying between its port and Cincinnati and Louisville. Its leading industries are represented by manufactories of engines and boilers, furniture, breweries, ship-yards, brass and iron foundries, and planing mills.

MADISON, the capital of Wisconsin, United States of America, founded in 1836, is beautifully situated on an isthmus between two lakes, 80 m. w. of lake Michigan, and the same distance e. of the Mississippi river. It contains the state capitol, university (founded in 1849), lunatic asylum, historical society, 4 banks, 2 daily, 1 tri-weekly, and 5 weekly papers, 2 of the latter being in the German language. It is the center of a fertile and salubrious country, and has a large trade. Pop. '70, 9,176.

MADISON (*ante*), a city, the capital of Wisconsin, the junction of the Chicago and North-western railroad, and the Watertown to Madison, and the Madison to Portage branches of the Chicago, Milwaukee and St. Paul railroad. It is the e. terminus of the railway to Prairie Du Chien, an important local shipping point; this railroad being the connecting-link between the Wisconsin and Iowa divisions of the Chicago and North-

western railway. Lying in the Four Lake country, the land on which it is built, between lake Mendota and lake Monona, 132 m. n.w. of Chicago, and 80 m. w. of Milwaukee, rises to an elevation of 788 ft. above the level of the sea, and 210 ft. above lake Michigan, and is about ¾ of a m. in breadth, and 3 m. in length; pop. '80, 10,325. Surrounding this plain are heights from which it is distinctly visible miles away. Lake Mendota on the n.w. border, with a depth of water estimated at 70 ft., is 9 m. in length and 6 m. in width, has a smooth, hard beach, and is navigated by excursion steamboats, from whose decks the most delightful views may be obtained. Lake Monona on the s.e., 5½ m. long and 2 m. wide, is connected by narrow straits with lakes Waubesa and Kegonsa, each about 3 m. long, and by straits farther s. flowing from these into the Fourth lake, forming a chain of beautiful lakes for a distance of 16 miles. The state-house is a stone edifice, with recent improvements costing $550,000, in height 200 ft., standing on a plateau 70 ft. above the water-level, surrounded by a beautiful park of 14 acres, shaded by forest trees left standing when the town was laid out, the foundation of the capitol being laid the following year. The county court-house and jail occupy the s. corner of the park. Westward from this point is College hill about 1 m. distant, 125 ft. above the lake, the site of the university of Wisconsin, open to both sexes. The city has 14 churches, a commercial college, a stereotype foundry, flour and woolen mills, wagon and carriage factories, manufactories of agricultural implements, reapers, mowing-machines, etc. It has a number of fine buildings for purposes of trade, and many elegant private residences in the suburbs. It is a popular summer resort, and its air is recommended as a palliative in diseases of the lungs. The state institution for medical treatment of the insane, 569 ft. in length, occupies an estate of 393 acres of forest, farm, and ornamental garden on the shores of lake Mendota, about 4 m. from the center of the city. The U. S. court-house and post-office here cost $400,000. It has excellent public schools, and several public libraries, among them the state library, of 7,500 vols.; that of the Wisconsin historical society, in a wing of the capitol, 58,000 vols., and a valuable collection of curiosities; those of the university of Wisconsin and its societies, 6,830 vols.; that belonging to the Madison institute, 3,500 vols.; and the state agricultural society library of 1000 volumes. About 1 m. from the capitol is the soldiers' orphans' home, on the shore of lake Monona.

MADISON, a village in n. Georgia, a shipping point for cotton, 104 m. w. of Augusta, 68 m. s.e. of Atlanta, and 175 m. w. of Savannah; pop. '70, 1389—770 colored. It is pleasantly situated on the Central railroad of Georgia, is the largest town between Atlanta and Augusta, and is rapidly increasing in population and business. It is the seat of justice of Morgan co., and has an active trade in cotton, the surrounding country being one of the most productive sections of the state. It is the seat of Georgia female college, established in 1850, an institution controlled by the Baptist denomination.

MADISON, a t. in Morris co., N. J., 17 m. w. of Newark, on the Morris and Essex division of the Delaware, Lackawanna and Western railroad. Its location is healthful and picturesque. It contains a classical institute, a Roman Catholic convent, 5 churches —the oldest of which is the Presbyterian, organized about the middle of the last century —and Drew theological seminary, established 1867, named after its founder, the late Daniel Drew of New York, and occupying what was formerly the Gibbon estate, containing about 100 acres, highly ornamented with walks and drives, shrubbery, and forest grove. The buildings are Mead hall—formerly the mansion-house of the estate—containing the chapel, reading-room, library, lecture rooms, and offices of the professors; Asbury hall, containing 72 rooms for students; Embury hall, containing a dining-room; Society hall, apartments for the matron, and 20 rooms for students; and 5 residences for the president and professors. The faculty are the president, who is also professor of historical theology, and 5 other professors. In addition to the systematic instruction thus furnished, special lectures on collateral topics are given by a large corps of representative men annually appointed. The number of students in 1880 was 104. The library contains 10,000 vols., carefully selected with special reference to the wants of students for the ministry; and in addition to these the libraries of the professors, amounting in the aggregate to about an equal number of volumes, are accessible to the students, under proper restrictions. The large endowment originally designed for the institution by the founder having been, in part, lost by his subsequent pecuniary misfortunes, successful efforts are in progress to make up the full amount by more general benefactions. The location of the seminary makes it the central theological school of the Methodist-Episcopal church, whose zeal, wisdom, and wealth may be relied on to secure for it the highest degree of permanent efficiency in the great work for which it has been established.

MADISON, JAMES, American statesman, and fourth president of the United States, was b. at King George, Va., Mar. 16, 1751. His father, James Madison, of Orange, was of English ancestry. He graduated at Princeton, N. J., in 1771, and studied law. In 1776 he was a member of the Virginia convention, and though too modest for an orator, his life from this time was devoted to politics, and he became one of the most eminent, accomplished, and respected of American statesmen. He was elected to the federal congress in 1779; in 1784 to the legislature of Virginia, in which he supported the measures of Mr. Jefferson in the revision of the laws, and placing all religious denominations

on an equality of freedom without state support. As a member of the convention of 1787, which framed the federal constitution, Mr. Madison acted with Jay and Hamilton, and with them wrote the *Federalist*. He did as much as any man, perhaps, to secure the adoption of the constitution, but opposed the financial policy of Hamilton, and became a leader of the republican or Jeffersonian party. He declined the mission to France, and the office of secretary of state, but in 1792 became the leader of the republican party in congress, and wrote the Kentucky resolutions of 1798, which contain the basis of the state-rights doctrines. Virginia, in the adoption of the constitution, declared her right to withdraw from the confederation, and at this early period established two state arsenals and made other preparations to resist the encroachments of a centralizing power. In 1801, Mr. Jefferson having been elected President, Mr. Madison was made secretary of state, which post he held during the eight years of his administration. In 1809 he was elected president. The European wars of that period, with their blockades and orders in council, were destructive of American commerce. The claim of the English government to impress seamen from American vessels was violently resisted. Mr. Madison vainly endeavored to avoid a war with England, which was declared in 1812, and continued for two years, at a cost of 30,000 lives and $100,000,000. He was one of the four presidents elected for a second term, during which he approved the establishment of a national bank as a financial necessity—a measure he had opposed and vetoed. In 1817 he retired to his seat at Montpelier, Va., where he continued to serve his country as a rector of the university of Virginia, and a promoter of agriculture and public improvements. Without being a brilliant man, he was a statesman of eminent ability and purity of character. He died at Montpelier, Jan. 28, 1836.

MADISON, JAMES (*ante*). The public life and works of James Madison fill a long period of American history, and are marked by a precocity of statesmanship, and calm, logical, judicial wisdom. At 21 years, a graduate of Princeton college, among a class of students who subsequently filled many of the highest judicial, political, and military offices, he appears from the beginning to have taken that intellectual leadership which he subsequently maintained. The exciting period of the opening of the revolution stimulated all young men of noble ambition to the study of the relationship of governors to the governed and of human rights in general; so that political discussions were on the fundamental laws of society in the broad fields of abstract justice, rather than in the ruts of partisan warfare and individual interests. The violence of arbitrary power which England exercised towards the colonies at this time, and the debates in the British parliament in which Chatham, Camden, Burke, and Fox assumed the defense of constitutional against arbitrary power, in opposition to lord North, Mansfield, and others, were calculated to place before the students of that day high ideals of political warfare. The vigorous pen of the masked Junius was a model of style for the more fiery patriots. That of Addison seems to have attracted young Madison, or, rather, his mind was by nature on the philosophic plane, so that it naturally expressed itself in a similar style. The following letter written from college to his father, July 23, 1770, indicates, however, that his mind was fired by the lack of patriotic resistance to British rule of which the merchants of New York had just given proof: "We have no public news," he writes, "but of the base conduct of the New York merchants in breaking through their spirited resolution not to import," etc. . . . "Their letter to the merchants of Philadelphia requesting their concurrence was lately burned by the students in the college yard, all of them appearing in their black gowns, and the bell tolling. There are about 115 in college and school, all of them in American cloth." On his return home from college he read law and miscellaneous literature, and at the same time taught his younger brothers and sisters. A lull took place in the controversy between the colonies and the mother country in consequence of the repeal of the stamp act and port duties, the tax on tea being the only one left; the repeal of which, said lord North, "is not to be thought of till America is prostrate at our feet." An extract of a letter written in 1772 to his college friend Bradford, afterwards attorney-general under the presidency of Washington, shows the grave maturity of his mind: "Pray do not suffer those impertinent fops that abound in every city to divert you from your business and philosophical amusements. You may please them more by admitting them to the pleasure of your company, but you will make them respect and admire you more by showing your indignation at their follies, and by keeping them at a distance. I am luckily out of the way of such troubles; but I learn you are surrounded with them, for they breed in towns and populous places as naturally as flies do in the shambles, because they get food enough for their vanity and impertinence." About this time Madison studied, exhausting the theological works of his time, and the Jewish and Christian Scriptures, and so erudite was he already considered that the founder of the university of Virginia called upon him to furnish a list of theological works for its library. When the question arose in Virginia, in 1774, whether the state church (the church of England) should be maintained, his breadth of view became manifest. The Episcopalians of Virginia and the Puritans of New England were quite ready to practice against others the same exclusion for religious opinions which had caused the migration of the latter. In Virginia the Episcopal had been a state church, and laws were in force to punish

non-conformity. The Baptists were at that time the subjects of the penalties and were then being imprisoned in the county where Madison lived, for "disturbing the public peace by their preaching." In a letter to Bradford, Jan. 24, 1774, Madison shows the intensity of his indignation at this renewal of religious persecution in words contrasting with his usual moderation: "That diabolical, hell-conceived principle of persecution," he writes, "rages among some; and to their eternal infamy, the clergy can furnish their quota of imps for such purposes." Again, writing to Bradford in April he says: "The sentiments of our people of fortune and fashion on this subject are vastly different from what you have been used to. That liberal, catholic, and equitable way of thinking, as to the rights of conscience, which is one of the characteristics of a free people and so strongly marks the people of your province (Pennsylvania), is but little known among the zealous adherents to our hierarchy."

The year 1774 was an exciting one in the colonies. New forms of oppression by the English government raised determined resistance from Boston to Charleston. Madison entered into the struggle in no half-way spirit, but seemed fully to appreciate from the beginning the necessity of speedy military organization to oppose the mother country. As early as Jan. 20, 1775, he writes a friend: "We are very busy at present in raising men, and procuring the necessaries to defend ourselves and our friends in case of a sudden invasion." In an address of thanks to Patrick Henry, written by Madison as the expression of a public meeting held in his own county May 9, 1775, we find this expression: "The blow struck in the Massachusetts government is a hostile attack on this and every other colony, and a sufficient warrant to use violence and reprisal in all cases in which it may be expedient for our security and welfare." Mr. Madison entered public life in May, 1776, as a delegate to the Virginia convention which instructed her delegates in the continental congress to propose the declaration of independence. Though the youngest man in that body, he was by special request made a member of the committee of ten to draft a new constitution for the state. In the committee Mr. Madison distinguished himself by opposing the use of the following phrase of an article on religion, designed to secure freedom of worship: "*toleration* in the exercise of religion, . . . unpunished and unrestrained by the magistrate, unless under color of religion any man disturb the peace, the happiness, or the safety of society," as a dangerous form of guaranty of religious freedom. Toleration, he maintained, belonged to a system where there was an established church, and where it was a thing granted not of right, but of grace. He feared the power, in the hands of a dominant religion, to construe what "may disturb the peace, the happiness, or the safety of society," and ventured to propose a substitute, which was finally adopted. It marks an era in legislative history; and is believed to be the first provision ever embodied in any constitution or law for the security of absolute equality before the law to all religious opinions. We give it entire: "That religion, or the duty that we owe to our creator, and the manner of discharging it, being under the direction of reason and conviction only, not of violence or compulsion, all men are equally entitled to the full and free exercise of it, according to the dictates of conscience; and, therefore, that no man or class of men ought, on account of religion, to be invested with peculiar emoluments or privileges, nor subjected to any penalties or disabilities, unless, under color of religion, the preservation of equal liberty, and the existence of the state be manifestly endangered."

At the first session of the Virginia legislature under the new constitution, beginning in Oct., 1776, Madison and Jefferson first met, and began an intimate friendship that lasted unclouded for half a century. Jefferson long afterwards thus describes him: "Mr. Madison came into the house in 1776, a new member and young; which circumstances, concurring with his extreme modesty, prevented his venturing himself in debate before his removal to the council of state in Nov., 1777. From thence he went to congress, consisting of few members. Trained in these successive schools, he acquired a habit of self-possession, which placed at ready command the rich resources of his luminous and discriminating mind and of his extensive information, and rendered him the first of every assembly afterwards of which he became a member. Never wandering from his subject in vain declamation, but pursuing it closely, in language pure, classical, and copious, soothing always his adversaries by civilities and softness of expression, he rose to the eminent station which he held in the great national convention of 1787. With these consummate powers was united a pure and spotless virtue which no calumny has ever attempted to sully."

In 1777 Madison lost his election by his conscientious abstention from the practice of "treating" on election day. But in November the assembly elected him a member of the council of state, a body of eight members, advisers of the governor, and participating with him in the exercise of executive powers. Chosen to this high position without his own knowledge, the compliment was not more appreciated by him than timely to the state, and a position of more importance during the crisis of war than one in legislative councils. The fact that Madison was the only member of the council versed in foreign languages made his services of additional value to the governor, Patrick Henry; as the number of foreigners in the employ of the state at that time was numerous.

It is told by him that the democratic sentiments of gov. Henry, as well as his own, were a little tried by the custom of French officers to address the governor as his royal highness monsieur Patrick Henry. On one occasion having to explain to a French

officer why power was given to the presiding officer of the delegates to preserve order according to rules established for that purpose, the officer exclaimed, "Ah! I understand you at last; he is a prince of the blood!" In 1779, Jefferson having succeeded Henry as governor of Virginia, Madison was re-elected to the council, but on Dec. 14 the Virginia assembly chose him to represent the state in the congress of the confederation, where he took his seat Mar. 20, 1780. It was the most gloomy period of the revolution. The country was without means or credit to feed the army; the continental money was nearly valueless, and there was nothing yet to take its place; the military situation most discouraging. The arrival of Lafayette, with news of the French fleet and army on its way, momentarily vivified the hope of the nation. But new reverses and the treachery of Arnold almost extinguished them. Mr. Madison had the sagacity to perceive that a better system of money was the radical need. Washington had advised requisitions on the several states for provisions and stores for his army to be furnished direct, in order to stop continental emissions of paper money for their purchase; but the states proceeded to purchase the required articles with their own paper money, thus aggravating the evil which he was hoping to lessen. Madison proposed that congress should address a formal recommendation to the states to discontinue these emissions. His proposition met with a cool reception, not because the recommendation was not approved, but because congress could with ill grace urge the states to abandon a means which itself had continuously employed. About this time efforts were being made by France and the United States to induce Spain to join the alliance against England. Spain required the abandonment of the right of navigation of the Mississippi to the sea as a condition precedent. Madison was made chairman of a committee to draw up the argument on behalf of the United States to be used as the basis of negotiations by Mr. Jay, our minister at Madrid, and Mr. Franklin our minister to France. The argument was unanimously adopted by congress. It is a curious fact that two of the oldest and most sagacious of American statesmen should thus receive their instructions from the most youthful and modest member of the congress. Madison's argument is a masterpiece of ability and discretion, but congress receded from its position. Spain's alliance was sought by the offer of the concession; but through the wisdom of Jay, fully seconding the views of Madison, no formal treaty to that effect was made.

After the capitulation of Yorktown in Oct., 1781, Madison was still strenuous that the government should not relax its preparations for the vigorous prosecution of the war; and secured action by congress to that end. At the same time he urged an amendment to the articles of the confederation, which should expressly grant to congress authority to employ the force of the union against the states in such manner as to force them to fulfill their engagements to it. In a letter to Jefferson, April 16, 1781, he thus alludes to the subject: "The necessity of arming congress with *coercive** powers arises from the shameful deficiencies of some of the states," etc. The letter entire is an admirable statement of the evils of a confederacy that has not the unity of power of a nation. It was not until the beginning of 1781 that the states were asked to vest in congress the power to levy duties on imports. On May 14, 1782, Madison in a letter to Randolph of Virginia gave intelligence of the arrival at New York of a bearer of peace-propositions from England. After reviewing the probable intent of the acts of the British parliament, he concludes: "Congress will, I am persuaded, give a proper verbal answer to any overtures with which he may insult them; but the best answer will come from the states, in such supplies of men and money as will expel our enemies from the United States."

After the recognition of the independence of the United States in 1782, Madison took a conspicuous part in every important legislation of congress; urged a system of national revenue; was principal author of the plan adopted April 18, 1783; and author of the address to the states urging its adoption, which, "for lucid exposition, pregnant conciseness and precision, dignity, eloquence, and force, will ever stand among the model state papers of America." It was in the preparation of this act of congress, and of the address which followed, that the opposition of Alexander Hamilton developed that great antagonism of principles and policy which, a few years later, became the basis of the opposing political organizations of the United States. Madison was the principal promoter of the cession of the north-western territories by Virginia to the United States on March 1, 1784. Vermont was, in 1784, to be admitted as an independent state. No provision had been made in the articles of confederation for the admission of new states. All lands outside the colonies, within the limits of the United States, were supposed to belong to one or another of the colonies. But the cession of Virginia's vast claims to the nation, and the denial of the Vermonters that their territory belonged either to the New York or the New Hampshire grants, opened new questions. Madison opposed the admission at this time and postponed it until the new constitution of 1787 was established. During this session congress entered on the difficult task of paying debts and harmonizing conflicting interests of states. The great state of Virginia was not able to pay its representatives in congress, and Madison was obliged to depend on his father in part for his support, and to have recourse to meet even the simple style of living that he always maintained, to "the favor," as he himself expresses it, "of Haym Salomon, a Jew broker." He returned to his father's residence Dec., 1783; and being ineligible to a con-

* Italics are in Madison's letter.

tinued seat in congress by Virginia's constitution he became an assiduous student of law. "My wish is" he wrote to a friend, "to provide a decent and independent subsistence without encountering the difficulties I foresee in that line. Another of my wishes is to depend as little as possible on the labor of slaves." In April, 1784, he was elected to the Virginia house of delegates. The leading idea of his service there he stated to be to harmonize the state legislation with the necessary assumption of powers required by the federal congress for its efficiency as a government of the United States. He was made chairman of the committee on commerce, of the committee to revise the constitution, and the "committee of religion." In all these he had occasion to imprint on the laws his peculiarly advanced statesmanship. In August, 1784, he met in Baltimore Lafayette, who was then on a visit of congratulation to his American friends, and they joined company in a journey to Ft. Schuyler, where a treaty with the Indians was to be made. Soon after the close of the second session of the Virginia assembly, Madison had another occasion to mark his influence in securing the disseverance of church and state, by exhaustive arguments in opposition to a pressure of petitions for "an assessment for the support of religion," which opposition he embodied in a remonstrance, and so aroused public opinion to its importance that when the bill was taken up the succeeding session it was overwhelmingly negatived. In 1785 Madison resumed his studies at home for a short time; made a visit to New York and the eastern states; to gen. Washington at Mt. Vernon; and returned to duty in the house of delegates in October, where he soon afterwards made a memorable speech to prove that the congress of the confederation should have sole jurisdiction over foreign and domestic commerce in the levying of import or export duties. At this session Madison bore the brunt of the laborious work of codifying the laws of Virginia. On returning to his home he added natural history to the list of studies which he entered upon with ardor, and at the same time pursued farther than before his studies in the philosophical speculations at that time the fashion among great minds, particularly in France. During 1786 he was an active participant in a politico-commercial convention assembled at Annapolis; opposed the project of Mr. Jay to surrender the navigation of the Mississippi to Spain; and re-entered the Virginia legislature in October. Its first work, of which he was one of the authors, was the passage of an act recommending the assembling of a convention of all the states for the formation of a new constitution for the United States. In this convention his thorough preparations for statesmanship became conspicuous. He completed and published papers, long in preparation, on *Ancient and Modern Confederacies; Vices of the Political System of the United States*, etc.; designed to light the way of the convention. He was sent as one of the delegates to that convention, associated with George Washington, Patrick Henry, Edmund Randolph, John Blair, George Mason, and George Wythe. In a letter to gen. Washington, April 16, 1787, he outlines his views at length of the future constitution: "Considering that an individual independence of the states is totally irreconcilable with their aggregate sovereignty, and that a consolidation of the whole would be as inexpedient as it is unattainable, I have sought for some middle ground, which may at once support a due supremacy of the national authority, and not exclude the local authorities wherever they may be subordinately useful. . . . An article should be inserted, expressly guaranteeing the tranquillity of the states against internal as well as external dangers. In like manner, the right of coercion should be expressly declared." It is doubtful if there ever convened an abler body of statesmen than met in the convention to frame the constitution of the United States, which opened in Philadelphia, May 14, 1787. Mr. Madison, if not the most conspicuous, was, by the volume of his labors, and his success in fixing his own views of government in the constitution, certainly the leading member, and it is in this sense that, young as he was compared with most of his associates, he acquired the title of "father of the constitution."

From the labors of the constitutional convention Madison repaired immediately to the federal confederate congress then sitting in New York, where he found strenuous opposition to the new instrument by Richard Henry Lee of Virginia and Nathan Dane of Massachusetts. Triumphing over these, his party in the congress secured a unanimous vote of that body to submit the constitution to the action of the several states. The various forms of opposition to it were met at the outset by a series of essays suggested by Alexander Hamilton and John Jay, in which Madison was invited to join, published over the signature of "Publius," first in a New York paper, but afterward as a distinct issue under the title of *The Federalist*. It grew under the hands of these gentlemen into one of the ablest compendiums of political thought ever published; finally comprising 85 essays, of which 51 were by Hamilton, 29 by Madison, and 5 by Jay. Judge Story in his treatise on the constitution styles it "an incomparable commentary." After eight states had voted their approval of the new constitution it only remained for the ninth to affirm it to secure its adoption. Virginia became the battle ground. A large part of her most eminent citizens took side against its adoption. Madison, at the urgent request of Washington, became a candidate for a seat in the Virginia convention called to take action upon it. The eloquence of Patrick Henry, and his tact in popular persuasion, was met in that convention by gov. Randolph in part, but more thoroughly and comprehensively by Madison; who, by his lucid reasoning, apt citations from his stores of historical knowledge, and masterly review of the errors of the opposition, turned the tide of

opinion in the convention. In the language of Bushrod Washington, who had listened to the debate, to gen. Washington, "Mr. Madison followed, and with such force of reasoning, and a display of such irresistible truths, that opposition seemed to have quitted the field." Yet the forensic battle raged for many weeks; Madison making in one day thirteen speeches in reply to Henry, Mason, Harrison, Monroe, and other brilliant leaders of the opposition. Voices of wisdom prevailed against voices of eloquence; and on June 24, 1788, Virginia ratified the constitution by the slender majority of 89 to 79. Chief justice Marshall being once asked who of all the public speakers he had heard he considered the most eloquent—and he had heard all the illustrious of his time—replied: "Eloquence has been defined to be the art of persuasion. If it includes persuasion by convincing, Mr. Madison was the most eloquent man I ever heard."

New York had not yet given its consent to the new constitution, and under the leadership of gov. Clinton continued to refuse it except under impracticable conditions, one of which was *the reservation of a right to withdraw from the union* if the amendments proposed by her should not be adopted within a limited period. Madison in a letter to Alexander Hamilton at this time writes his unqualified repugnance to all propositions of the kind, and regarded such a conditional ratification as worse than a rejection. At the request of gen. Washington he became a candidate for the new national senate under the constitution; but Richard Henry Lee of the opposition was supported by gov. Henry, and elected; after which Madison was elected from his own district to the house of representatives in congress, in spite of the formation of a district, by the legislature under the control of gov. Henry, for the express purpose of insuring his defeat.

On April 8, 1789, after the assembling of congress in New York and the inaugural address of Washington, Madison presented the first act under the new constitution, for the collection of revenues. This was followed by an act to levy tonnage duties on vessels of nations not having reciprocal commercial treaties with the United States, and especially designed to meet the hostile legislation of England, which had haughtily refused to enter into such treaty, and had excluded the vessels of this country from all trade with her West Indian colonies, admitting them to British ports only on special conditions; while up to this time British vessels had a monopoly of the foreign trade of America. He carried his measure, but against the determined opposition of the city of New York, which, being the capital, exercised an undue influence in the national legislation; and was, as Madison expresses it, "steeped in Anglicism." Early in the same session he brought in declaratory amendments of the constitution, in the nature of a bill of rights, to quiet apprehensions in the public mind which had given ground for much of the opposition to the constitution. On the re-assembling of congress in Jan., 1790, Madison's most conspicuous action was on the report of Hamilton, first secretary of the treasury, recommending the funding of the national debt. The secretary's report started lively speculation in the old state bonds and continental currency; the former being increased in value by their proposed assumption by the United States, and the latter resuscitated from no value to a certain low percentage of their face value. Madison advocated the payment of the domestic debt as equally obligatory as the foreign debt, but since it was impossible to pay the face value of the continental money in gold and silver, and the rate of valuation for payment had been agreed to, he could not consent that the speculators, who had bought these evidences of debt, should receive the whole, and the holders who had parted with them when they were supposed to be valueless should have little or nothing. He puts the case in these words: "As" to pay in full "would far exceed the value received by the public it will not be expected by the creditors themselves. To reject the claims wholly is equally inadmissible. To make the other class (original holders) the sole victims was an idea at which human nature recoiled. A composition then is the only expedient that remains. Let it be a liberal one in favor of the present holders; let them have the highest price which has prevailed in the market; and let the residue belong to the original sufferers." As this position aroused, from those who held these papers, a storm of opposition in favor of the commercial rigor of exact fulfillment, without reference to whose hands those papers were in, he replied: "He must renounce every sentiment he had hitherto cherished, before his complaisance could admit that America ought to erect the monuments of her gratitude, not to those who saved her liberties, but to those who had enriched themselves in her funds."

Madison opposed the assumption of the states' debts by the general government, and three times secured the defeat of the proposition; but it was at last carried by a compromise with those who desired the capital located on the Potomac. During this session of congress the federalists and republicans became distinct parties, Alexander Hamilton being the leading spirit of the former, and James Madison the foremost parliamentarian of the latter.

At the close of this session it devolved upon Mr. Madison to announce to the house the death of Franklin, which was done in words of simplicity as felicitous as the character they commemorated. The result of the first session of the 1st congress in New York was to give the representatives of the southern states a feeling of uneasiness as to the power of New England and New York to control all legislation, in which Mr. Madison participated. In the beginning of the second session a bill for the incorporation of

a national bank passed the senate. Madison opposed it in the house, argued its unconstitutionality, and united the southern states against it; but it was carried by the northern members. President Washington was in painful doubt whether to sign the bill. His attorney-general gave an elaborate opinion that it was unconstitutional. Jefferson was of the same opinion. Hamilton wrote an elaborate reply to prove its constitutionality. Washington requested Madison to reduce to writing the objections to the bill, with a view, it was supposed, to embody them in a veto; and Madison carefully prepared such a paper; but the president, at the last moment, signed the bill out of deference to the majorities which had passed it. Madison soon after opposed a congressional practice of calling on the heads of departments for their opinion; opposed again the assumption of the debts of the states; protested against the demoralizing effects of the banking and funding system of the secretary of the treasury; took spirited ground against the visitation of American ships by the British, and announced that the settled policy of law should be that "free ships make free goods." Washington, when his first term was near its close, requested Madison to prepare for him a valedictory address, which he did prepare; remonstrating with the former at the same time against his determination not to run for a second term. Washington did consent to a second election, and Madison's manuscript was preserved by him and included entire in his noble farewell address to the American people. In the third session of congress Madison made a vigorous criticism on the acts of Hamilton as secretary of the treasury in diverting public moneys, pledged to pay a debt to France, for the use of the national bank, to the discredit of the honor of the country; and, to a series of political articles written by Hamilton over the signature of "Pacificus," broaching doctrines as to the powers of the executive under the constitution, which Madison thought dangerous, he replied by a masterly series of five essays over the title of "Helvidius;" to which Hamilton made no reply. These were written from his father's farm after the close of the 2d congress. In the second session of the 3d congress Madison renewed his resolution for additional duties on the manufactures and shipping of those countries having no commercial treaties with the United States, being especially aimed to counteract the injurious effect of British discrimination against American commerce, embracing a specific retaliation for specific measures of hostile foreign legislation. This was not passed, but postponed till the next session, when new outrages on American commerce on the part of England called for the appointment of special commissioners to England. Towards the close of the session Madison reviewed the acts of congress in a pamphlet entitled *Political Observations,* now of great value.

In the recess of congress, on Sept. 15, 1794, Madison married Mrs. Dorothea Payne Todd, whose beauty, gracious tact, and kindness of heart and lively social qualities made her circle of admirers and her influence as extensive within her sphere, for the remainder of their lives, as her husband's; and as wife of the president, a few years later, she became the model of all the graces of life that adorn high stations.

The so-called whisky rebellion in Pennsylvania furnished Hamilton, secretary of the treasury, with an opportunity to invoke military force in its treatment, in a manner that indicated the tendency to the use of despotic force which was the characteristic of his statesmanship. Democratic societies had sprung up in the country somewhat in the intemperate style of the Jacobins of Paris. The federalists sought to obtain resolutions of condemnation by congress of these societies. Madison, while making no defense of their spirit, made such lucid expositions of the danger of such a resolution that it was finally negatived. The increase of the standing army was vigorously pressed by the federalists; Madison opposed it but the federalists prevailed. In Aug., 1795, he protested against a treaty with England, which yielded the right of search of American vessels, and which he speaks of as adding "to the ruinous bargain with that nation a disqualification to make a good one with any other." In the last session of the 4th congress he bore a conspicuous part in a three weeks' discussion on the constitutional limits of the treaty-making and legislative powers. President Washington assumed a position with reference to this subject that Madison felt called upon to oppose, and in doing so carried more than two-thirds of the house of representatives in his support, and made the precedent for a participation by the legislative department in carrying treaties into effect which has since become a principle of our government. His service in the house of representatives ceased with the administration of Washington.

In the beginning of John Adams's administration, the passage of the alien and sedition laws by the dominant federal majority gave rise to vigorous protests from the state legislatures of Kentucky and Virginia. The latter are known in history as the resolutions of 1798–99, and were drawn by Madison, though he was not a member of the state legislature. They now stand among the highest authorities on constitutional construction. Animadversions upon these drew from Madison the following winter a report in which he fortifies the positions taken in the resolutions by a state paper of signal vigor of style and exhaustive analysis of the reason and philosophy of the resolutions. Though few of the states followed the bold stand of Virginia at this time, the act of congress which called out the resolutions speedily fell into disrepute, and the legal position assumed by Madison became, a few years later, the settled law of public opinion.

On the inauguration of Jefferson as president in 1801, Madison was made secretary of state, and retained this ministerial position during the whole eight years of Jefferson's

administration. The harmony of his principles with those of the president produced a unity and ability of administration rarely continued for so long a period. It is, however, a curious illustration of the accident of events that during the whole time when gratitude, honor, and policy all required the most cordial relations to be maintained with France, and the most spirited opposition to the continued domineering policy of England, the federal policy had permitted a craven treaty to be made with the latter, and an offensive form of neutrality to be needlessly pushed in the face of our revolutionary ally; while now that the friends of that ally were in power, the tyrannous domination of Napoleon in the government of France had taken from our national sympathy its real object—to honor liberty and republicanism. At the close of Jefferson's term, Madison was the leading candidate of the republican party for his successor, and received in the electoral college 122 out of 175 votes. He was inaugurated president, Mar. 4, 1809. He made Roger Smith of Maryland secretary of state until April 2, 1811, when he was succeeded by James Monroe of Virginia; Albert Gallatin of Pennsylvania secretary of the treasury till Feb. 9, 1814, when he was succeeded by George W. Campbell of Tennessee; for secretary of war, William Eustis of Massachusetts till Jan. 13, 1813, when James Monroe acted as secretary of war, *ad interim*, till the appointment of W. H. Crawford, Mar. 3, 1815; for secretary of the navy, Paul Hamilton of South Carolina, till Jan. 12, 1813; succeeded by William Jones of Pennsylvania, till Dec. 17, 1814, and then by B. W. Crowninshield of Massachusetts; for postmaster-general, Gideon Granger of New York, succeeded by R. J. Meigs of Ohio; for attorney-general, successively, Cæsar A. Rodney of Delaware, William Pinckney of Maryland, and Richard Rush of Pennsylvania. The continued arrogance of British claims and acts of interference with American commerce, the seizure and impressment of sailors from American merchant ships, had brought the United States to the verge of war with Great Britain when Madison's administration began. An embargo on British commerce was ordered, followed by a non-intercourse act of congress, prohibiting commerce with France or England until the British orders in council relating to seizure of neutral vessels and impressment of seamen should be repealed; and the decrees of the French emperor concerning the rights of neutrals should be rescinded. Embroilments between the British minister and the American secretary of state followed. Madison requested the recall of the obnoxious minister. The English government recalled him but sent no other in his place. In August the French emperor revoked the obnoxious commercial decree, and in November Madison issued a proclamation for the renewal of trade with France, and of non-intercourse with England. But Napoleon's irritating maritime practices continued; and the prospect was imminent that the national dignity would require a state of war with both England and France. Madison made every effort to preserve peace, and prepared for war. Congress appropriated $1,000,000 for naval and military preparations. On June 1, 1812, he transmitted a special message to congress, reviewing the aggressions of Great Britain, and left it to the judgment of congress to declare war. It was done, and the president signed the declaration of war, June 18, 1812, and issued a proclamation to the people. June 23 following, Great Britain, before the news of the declaration had reached her government, repealed the most obnoxious of her orders in council. Monroe, secretary of state, before the British action could be known, submitted to the American minister in London terms of a proposition for an armistice to be suggested to the government. The London government refused the required concessions, and the American minister returned home. Admiral Warren, of the British navy, was sent out to negotiate with the American government; but yielding no promise to stop the impressment of American seamen, the war began. In Feb., 1813, a British fleet was in Chesapeake bay, and the whole coast of the United States was declared in a state of blockade. Madison had been elected the autumn before for his second term as president, by a vote of 128 in the electoral college to 89 for De Witt Clinton. His inauguration, Mar. 4, 1813, found the war fairly opened. The same month Alexander I. of Russia offered his mediation for peace, which was accepted by the United States and refused by Great Britain in September; but in November she signified a willingness to treat. In Jan., 1814, Henry Clay and Mr. Russell were sent to England for that purpose, but no progress was made, and in August the British troops captured and burned the public buildings of Washington, including the president's house The damages inflicted on British commerce by our privateers, and the battle of New Orleans, brought about a treaty of peace, which was signed by the United States commissioners at Ghent, Dec. 24, 1814. But it contained no concession of the British claim to impress seamen; which, however, though not yielded in theory, was abandoned in fact. The country had made brilliant successes in naval battles with English ships, and had acquitted itself not without honor in its land engagements; but the war developed a low order of patriotism on the part of the commercial or maritime interests of the country, which not only impaired its vigor, but pressed for peace with mercenary haste. The last three years of Madison's administration were marked by no important events, unless his concession to the establishment of a national bank, which he had always opposed, and once vetoed, may be considered one. Its subsequent dishonorable history was a proof of the soundness of his previous objections. Mr. Madison retired from public life with the close of the presidential term, Mar. 4, 1817, to his farm at Montpelier, Va., where he lived his remaining years happy in domestic affection, social enjoyments, farming, and literary labors. In 1829 he per-

formed his last public service, as a member of the Virginia constitutional convention, where his frail and venerable figure and broken voice received the homage of the most profound attention and respect. His wife survived him, living to the age of 82, and died in Washington, July 12, 1849.

MADISON, JAMES, D.D., 1749–1812; b. near Port Republic, Va.; a second cousin of president Madison; graduated at William and Mary college in 1768; was admitted to the bar, but relinquished the law for the ministry; was chosen professor of mathematics in William and Mary college in 1773, and president in 1777. In 1775 and 1777 he visited England, and devoted his time to the study of the higher branches of science. In 1784 he became professor of natural and moral philosophy; in 1790 was consecrated the first bishop of Virginia by the archbishop of Canterbury in Lambeth palace, and also performed the duties of president and professor until his death. Besides some addresses, he published *Eulogy on Washington;* a large *Map of Virginia;* some papers in Barton's *Journal,* and in the *Transactions* of the American society.

MADISON UNIVERSITY, at Hamilton, Madison co., N. Y.; a Baptist institution, was founded as a seminary in 1820; reorganized into an academy, college, and theological seminary in 1832, and chartered under its present name in 1846. It has an endowment of $430,000 (mostly raised since 1864), an annual income of $38,234, and unproductive property amounting to $150,000. It has a library of 11,000 volumes, a fine museum, a cabinet of minerals, and a laboratory and apparatus. The site, elevated about 60 ft. above the waters of the Chenango and the plain below, having pure springs of water in the rear, and in front the village of Hamilton, presents a landscape of great loveliness, and for the student, a home of health and beauty. Besides a president's house, professors' houses, gymnasium, and university boarding hall, there are three edifices of stone, used strictly for college purposes. The hall of alumni and friends, 107×73 ft., has ten lecture rooms, a library, a college chapel, and a large audience room, 107×73 ft., for college commencements. West college, 100×60 ft., and East college, 100×56 ft., are mainly occupied by students' rooms and dormitories; but East college has two halls for literary societies and two academical drill-rooms. West college has, also, an auditorium, a museum of foreign curiosities, a museum of natural history, and a set of rooms for chemistry, geology, and physics. The university awards $500 a year as prizes, and pays of itself $4,500 annually to students on scholarships, and over $5,000 more, through the education society, for the benefit of the needy. Number of instructors in 1880, 22; students in college, 88—in theological seminary, 38. E. Dodge, D.D., LL.D., president.

MÄDLER, JOHANN HEINRICH, 1794–1874; b. Prussia; at first an instructor in the Berlin normal schools. He published a map of the moon, 1834–36; and the latter year he was appointed to a position in the Berlin observatory. The next year his *Allgemeine Selenographie* appeared, in two volumes. In 1840 he was made director of the observatory at Dorpat, where he published, in 1846, *Die Centralsonne,* in which he propounded the theory that the star Alcyone in the Pleiades is, or in its position represents, the center of the stellar universe. He also published a popular astronomy and a history of astronomy. His researches in regard to variable and double stars are of great value, and he ranks as one of the eminent astronomers of the century.

MADOC, son of Owen Gwynnedd, a Welsh prince, is believed by his countrymen to have discovered America about 300 years before Columbus. Compelled, it is said, by civil strife to abandon his native land, he sailed westward in 1170 with a small fleet, and after a voyage of several weeks, reached a country whose productions and inhabitants were quite unlike those of Europe. Here he lived for a long time; then returning to Wales, he gave an account of the new land that he had discovered, equipped another fleet, set sail again, and was never more heard of. The story of Madoc will be found in the *Historie of Cambria, now called Wales, a part of the famous Yland of Brytaine, written in the Brytish Language above 200 years past by Caradoc; translated into English by H. Lloyd, gent.; corrected, augmented, and continued by David Powell* (London, 1584). See also Owen's *British Remains* (1777). There is considerable reason for suspecting the genuineness of this Welsh tradition; and even if true, the Northmen have a prior claim to the discovery of America, for it is beyond doubt that Greenland and the New England states were visited, if not colonized, by Icelanders or Norwegians at a much earlier period. Southey has chosen the story of Madoc as the subject of one of his so-called "epics."

MADONNA, an Italian word signifying *my lady,* and specially applied to the Virgin Mary. It has now become common in other languages, particularly in reference to works of art. The earliest Christian art, however, did not attempt any representation of the mother of Christ; such representations first make their appearance after the 5th c., when the Virgin was declared to be the "Mother of God." The face of the mother is generally full, oval, and of a mild expression; a veil adorns the hair. At first, the lineaments of the Virgin's countenance were copied from the older pictures of Christ, according to the tradition which declared that the Savior resembled his mother. A chronological arrangement of the pictures of the Virgin would exhibit in a remarkable manner the development of the Roman Catholic doctrine on this subject. The Madonna has been a principal subject of the pencils of the great masters. The grandest success has been

achieved by Raphael, in whose pictures of the Madonna there prevails now the loving mother, now the ideal of feminine beauty, until in that of St. Sixtus he reaches the most glorious representation of the "Queen of Heaven." Among symbolic representations may be mentioned Mary with the white mantle, i.e., the mantle of love under which she receives the faithful; and the Virgin with the half-moon or with the globe under her feet, according to the meaning put upon the twelfth chapter of Revelation. The Virgin was never represented without the child until comparatively recent times. For further information, the reader should consult Mrs. Jameson's delightful work, *Legends of the Madonna* (Lond. 1852).

MADOCKAWANDO, about 1645–1700, an Indian chief of the Etchemin tribe of the Penobscot. In the French and English wars he at first favored the English; but a French baron having married his daughter, he took the other side and for years devastated the New England borders.

MADOQUA, *Antilope saltiana*, or *Neotragus saltianus*, a species of antelope, abundant in Abyssinia; one of the smallest, if not the very smallest of horned animals, being scarcely the size of a hare. Its legs are long and slender; its tail very short; its horns short and conical, the males alone having horns; the general color is gray, the fore-parts reddish.

MADOU, JEAN BAPTISTE, 1796; b. in Brussels; early distinguished for his talent in depicting picturesque phases of life. In 1855 he sent to the exposition of Paris two pictures entitled a "Trouble-fête" and the "Fête-au-Château" for which he obtained the second medal and the cross of honor. He became professor of the royal school of Brussels and member of the academy of Antwerp. In 1821 he published a superior lithographic work entitled *Voyage Pitteresque dans le Pays Bas*, which attracted much attention. This was followed by works on the ancient and modern costumes of the Low Countries, and scenes in the lives of the Flemish and Holland painters. His latest work was *Physionomie de la Société en Europe, de Louis XI à nos Jours*, with 120 plates, 1835, which has a high value.

MADOZ', PASCUAL, 1806–70; b. Spain; was educated at Saragossa, but was expelled from the university as a schismatic, and resided for some time in France. He returned to Spain, and edited the *Diccionario Geográfico Universal*, and a *Coleccion de Causas Célebres*. He became prominent in politics, was appointed a judge, and was made military governor of the valley of Aran. In his new office he conducted operations against the Carlists, and was elected a member of the cortes. He opposed Espartero, and eventually took the lead of the party known as *progresista* in the cortes. He became minister of finance in 1855, but retired after holding the office a few months, and in the following year opposed the O'Donnell ministry and was obliged to flee. He was active in the revolution of 1868, was governor of the province of Madrid, and a member of the constituent cortes. He died while accompanying the Spanish deputation to Rome, to offer the crown of Spain to Amadeus. He left an important work of which he was both editor and publisher, printing it in the office which he had established. This work is the *Diccionario Geográfico Estadistico y Historico de España;* 16 vols. 4to, Madrid, 1848–50.

MADRAS', one of the several local governments of British India, still commonly called the "presidency of Madras," occupies the southern part of the Indian peninsula. The 21 districts immediately under the governor of Madras had in 1871 a pop. of 31,672,613, and an area of 138,318 English sq.m.; and the tributary states of Travancore, Pudukota, and Cochin, with an area of 9,471 sq.m., have a pop. of 3,226,427. Mysore is for military purposes attached to Madras. On the Malabar coast, where more rain falls than on the eastern side of the peninsula, the mean temperature is 78°; on the Coromandel coast the average is 84°, and the barometer occasionally stands at above 100°. Rice, cotton, indigo, coffee, sugar, maize, millet, are extensively cultivated, and the minerals are iron, manganese, copper, magnesia, antimony, lead, and silver. The revenue for 1876 was £8,360,488; the expenditure, £5,991,449.

MADRAS (called by the natives *Chennapatanam*, "the city of Chennappa," an Indian prince), a maritime city of British India, capital of the government of the same name, is situated on the Coromandel coast, the western shore of the bay of Bengal, in lat. 13° 5′ north. No commercial center of equal size and importance is so unfortunate in its site. The roadstead is open to every wind except that from the w., and in the case of a sudden gale, vessels are obliged to run for the open sea. The city is not built on a navigable river; the soil of the vicinity is but moderately productive; and during the hot months the thermometer, even in a well-appointed room, rises to 96°. In calm weather the surf breaks 300 ft. from the shore, and its wave is 3 ft. in height; during a storm, it breaks 1000 ft. from shore, with a wave 14 ft. high, and at such a time any attempt to land, even in the boats of the natives built for this purpose, is most dangerous. The seasons are distinctively marked by the monsoons, the n.e. lasting from October to February and the s.w. from May to October. The force of the latter, however, is so much broken by the Ghats that its influence is hardly felt. During the hot months, the climate of Madras is pleasantly modified by a sea-breeze, called by the residents "the doctor," which sets in at noon and lasts till night. The city, with its suburbs, which are nine in number, extends along the coast for 9 miles, and has an average breadth of 3½

miles. On the coast, and midway between the n. and s. extremities of the city, is fort St. George, strongly fortified, and garrisoned usually by a regiment of European troops and two companies of artillery; there are also, however, three regiments of native infantry generally stationed here. Within the fort are comprised the council-house and a number of civil and military offices. The district of Black Town, n. from the fort, lies low, in some places being only 6 in. above sea-level at spring-tides. It is defended, like the fort, from the encroachments of the sea by a strong stone bulwark. In Black Town are the seven wells, the water of which, filtered through a bed of fine sand, is exceedingly pure and wholesome. The principal buildings and institutions are government house, a handsome edifice, though much inferior to the similar establishments in Calcutta, and even in Bombay; the light-house, to the n. of the fort, 128 ft. above sea-level, and having a light, said to be one of the most brilliant in the world; the Scotch church of St. Andrew, founded in 1818, a stately and beautiful edifice; the university, with European professors, and numerous teachers, both European and native, and containing a valuable museum and a library; St. George's cathedral, from which a magnificent view of the city and its vicinity may be obtained, and containing several monuments by Chantrey (including one of bishop Heber), and some figures by Flaxman. There are also military male and female orphan asylums, a medical school, a branch of the royal Asiatic society, the Madras polytechnic institution, the government observatory, a mint, the churches of numerous Christian denominations, and the Madras club, to which members of the Bengal and Bombay clubs are admitted as honorary members. Madras stucco, or *chunam*, is largely employed in the decoration of public buildings. When laid upon walls, pillars, etc., dried and polished, it has the appearance of the finest Parian marble. The first British settlement on this coast was at Armagon, 60 m. n. of Madras; but the seat of the present fort being granted by a native prince in 1639, a removal took place, and the nucleus of the present city was at once formed. Madras is now the residence of the government of the presidency, including the governor, the members of council, etc., and of the judges of the supreme court. The tables of Europeans in this city are supplied with beef, mutton, and many other home luxuries. Pop. '71, 397,552 of whom about 20,000 are Europeans, and the great body of the remainder Hindus. The chief articles of export are rice, cotton, hides, skins, and especially coffee. The value of the exports from the Madras ports in 1876 was £4,548,830. The imports for the same year amounted in value to £2,038,330. Madras has telegraphic communication with England, and therefore America; and, in 1871, cables connecting it with Hong-Kong were laid. Madras has railway communication with Bombay, Calcutta, and consequently with the main system of Indian lines.

MADRAS SYSTEM. See MUTUAL INSTRUCTION.

MAD'REPORE, *Madrepora*, a genus of zoophytes (*anthozoa*), the type of a family, *madreporidæ*, in which the polyps have twelve short tentacles, and the polypidom is stony. The name, however, is often more extended in signification, and popularly is not clearly distinguished from CORAL. The polypidom is sometimes arborescent and branched, sometimes spread out in a leaf-like form. The cells in the true madrepores are isolated and lamellated, spread over the surface of the polypidom like little stars. The variety of forms among the madrepores is very great, and many of them are very beautiful. They are all found in the seas of warm parts of the world. The *astræas* are generally in large convex masses, the surface hollowed with crowded stars. They increase with great rapidity, as do some of the other madrepores, and are often found in huge masses, composing some of the most recently formed rocks.

MADRID', a province of central Spain, in New Castile, bounded by the provinces of Toledo, Segovia, Avila, Cuenca, and Guadalajara; watered by the Tagus river; 2,997 sq.m.; pop. '70, 487,482. It is a mountainous region, with a mean elevation above the sea level of 3,500 ft., a severe climate, and little vegetation. In the s. and w. parts, where the soil is fertile, there is a large yield of hemp, barley, oats, wheat, and rye; and there is a slight production of olive oil and wine. Capital, Madrid.

MADRID', the capital city of Spain, in the province of the same name in New Castile (see CASTILE), is situated near the center of the country, on the left bank of the Manzanares, a small stream whose waters join those of the Jamara, an affluent of the Tagus. It is built on a hilly, barren, and ill-watered plateau, 2,060 ft. above sea-level, offering on the one hand, no protection against the bitter n. winds from the snowy peaks of the Guadurrama mountains, and on the other, open to the *Solano*, the south-eastern wind, which, aided by a glaring sun, often raises the temperature to 90° and even to 105° in the shade. In winter, the temperature sometimes falls to 18°. Summer, however, is the most trying period. During this season, the sunny and shady sides of the same street may differ 20° in temperature. Not without justice has the climate of Madrid been proverbially described as *tres meses de invierno y nueve del infierno* (three months of winter and nine months of hell). The rate of mortality is 1 in 30 to 34. The city is circular in shape, and is surrounded by low walls pierced by 16 gates. It contains 32 churches, 14 barracks, 13 hospitals, 18 public libraries, 4 foundling hospitals, 13 royal academies, numerous elementary schools, a university, 7 leading and numerous minor theaters, an ample supply of newspapers, many literary and artistic institutions, above a dozen nunneries—44 monasteries were suppressed in 1836. The number of palaces is great. The

principal architectural feature is the royal palace (*palacio real*), a splendid edifice, built of granite, and of a stone resembling white marble. It is a square 470 ft. in length on each side, and 100 ft. in height, and incloses a court 240 ft. square. There are two libraries, the public and the private royal libraries: the former, containing 230,000 vols., is well kept and tended; the latter, with 100,000 vols., is rapidly falling to decay. The royal armory is one of the finest in the world; the Toledo blades, the artistic armor, and shields from Augsburg and Milan, are superb. The armory contains relics of the greatest Spanish epochs, and furnishes in itself a realization of Spanish history. The *Museo*, said to be one of the finest picture-galleries in the world, besides specimens of many other famous painters, contains 10 of Claude, 22 of Van Dyck, 16 of Guido, 46 of Murillo, 21 of N. Poussin, 10 of Raphael, 62 of Rubens, 52 of Teniers, 43 of Titian, 27 of Tintoretto, 62 of Velasquez, 24 of Paul Veronese, and 10 of Wouvermans. Of all these pictures, the most wonderful are those by Velasquez, whose finest work is here, and who, indeed, can here only be studied to advantage. The general aspect of Madrid is that of a new city, with fine houses, streets, and squares. In the squares are numerous statues—as that of Philip IV. (in the *plaza de Oriente*), a splendid equestrian work, 19 ft. in height, and weighing 180 cwt.; the statue of Cervantes, etc. In and around the city, also, are numerous public walks. The manufactures of the city are unimportant. The artisans and tradesmen are supported by the court, the nobility, the officials, and the innumerable body of place-hunters. Pop. '70, 332,024; of the province, 484,541.

The first historical mention of Madrid occurs under Ramiro II., king of Leon, who took this city in 932. In 1083, when Madrid, or, as it was then called, Majerit, was captured by Alfonso VI. of Castile, it was merely a Moorish fortified outpost of Toledo. It rose into some importance in the beginning of the 16th c., when Charles I. (afterwards the emperor Charles V.) removed his court hither. In 1560 is was declared the only court by Philip II. A number of memorable treaties have been concluded in Madrid, and bear its name, particularly that between Charles V. and Francis I. of France in 1526; that between Spain and Venice in 1617; and that between Portugal and Spain in 1800. In the Spanish war of succession, it favored the French party; and in the war of freedom against France, it gave the signal for a general rising by an insurrection against Murat on May 2, 1808, in which 1500 of the citizens of Madrid lost their lives. From 1809 till 1812 it was held by the French; but in the latter year, the duke of Wellington entered it and replaced it in the hands of its legitimate rulers. Madrid, always opposed to the Carlists during the recent civil strife of Spain, adopted the cause of king Alfonso in 1874.

MADRIGAL, a word of uncertain etymology, denotes a short lyrical poem, adapted to the quaint and terse expression of some pleasant thought, generally on the subject of love. The proper madrigal consists of three verses or strophes, generally bound together by rhymes; but this form is not always adhered to, and the name is sometimes applied to little love-poems of any form. Among the Italians, the best writers of madrigals are Petrarch and Tasso; among the French, Montreuil, Lainez, and Moncrif; among the Germans, Ziegler (the earliest), Voss, Manso, Goethe, and A. W. Schlegel; and among the English, the poets of the Elizabethan and Caroline ages, several of whom, such as Lodge, Withers, Carew, and Suckling, have written verses, sometimes called madrigals, sometimes songs, the grace and elegance of which have never been matched.—The name madrigal is also applied to pieces of vocal music of a corresponding character. The musical madrigal, which originally was a simple song sung in a rich artistic style, but afterwards with an instrumental accompaniment (generally the organ), is believed to have originated with the Flemings, and dates from the middle of the 16th century. It went out of fashion about the beginning of the 18th c., but the later *glee* may be regarded as a similar composition. The English madrigalists are especially famous. Neither Italy nor the Netherlands has produced greater names than Morley, Wilbye, Bennett, Ward, Orlando Gibbons, Dowland, and Ford.

MADURA, a maritime district in the s. of British India, in the presidency of Madras, is bounded on the e. by the strait which separates Hindustan from the island of Ceylon. It has an area of 9,502 sq.m., and a population in 1871 of 2,266,615. Eastward from the shore runs a narrow ridge of sand and rocks, mostly dry, and which almost connects Ceylon with the continent. Cotton is the chief commercial crop; and sugar-cane, betel-nut, and tobacco are also grown. The principal town is Madura, on the river Vygat, with several noteworthy public buildings.

MADU'RA, the capital of the district of Madura, in the province of Madras; 270 m. s.w. from the city of Madras; pop. 36,000. It was anciently the seat of the Pandian kingdom, which was founded 500 B.C. Ambassadors from the king of Pandya visited Rome in the time of Augustus. Early in the Christian era a college was founded here for the cultivation of Tamil literature, and was distinguished throughout India for the learning of its professors. They took great pains to keep the language free from Sanskrit words, which were then beginning to be brought from the north, and to this day no Tamil is there considered pure that has any mixture of the northern tongues. The last sovereign, queen Menakshi Amman, was dethroned by Chunder Saib, 1736; from 1740 to 1760 the city was repeatedly besieged, and was often in the hands of rebels. Till recently it had a double wall with 72 towers surrounded by a ditch from 60 to 70 ft.

wide. Some of the native edifices give evidence of ancient splendor, but most of the dwellings are very inferior. The temple of Meenarchi or Fish mother is in the center of the city, and is the fourth of the seven strongholds of idolatry in India. It is said to have been partially destroyed in the flood of Menu, and to have been rebuilt by Sekhara Pandian in the 2d or 3d c., to have been nearly destroyed during the second Mohammedan conquest in the 14th c., and renewed by Viswanatha Naick. Its present splendor is due to Tirumal Naick, the last rajah, who reigned 1622–62. The outer wall of the temple is a parallelogram of 800 by 700 ft., within which are 50 buildings devoted to the various purposes of the temple worship, and the use of those who conduct it. The wall is of granite with a parapet of brick, and is 37 ft. high. The main entrances are by four gateways 30 ft. high, through towers 50 or 60 ft. wide at the base which rise in 11 stories to the height of 150 feet. One choultrie or rest-house within the inclosure built by Tirumal Naick is 312 ft. by 125, the roof supported by 162 columns, many of them wrought from a single stone. Fifty-four of these columns are 30 ft. high, of 2 stones fitted face to face so as to look like one solid block 4½ ft. thick, carved on all sides with life-size figures in full or in bas-relief. The granite roof of one room is supported by 1,000 columns, and the columns in the whole temple number 10,000. There are also remains of a palace of considerable magnificence built by Tirumal Naick. Madura has been the metropolis of Hinduism for southern India. Early in the 17th c. a Roman Catholic mission was established here, and continued for about 150 years. In 1837 the mission was re-established, and has prospered. Up to 1835 no Protestant missionary had ever resided in the city. In that year a mission was established by the Rev. Daniel Poor and others of the American board, and much has been accomplished for the enlightenment of the people. From this center Christian work has extended to several other cities and many villages; between 30 and 40 native churches have been formed, more than 150 native congregations gathered, and about 7,000 converts recorded; a large number of children are under instruction in over 100 schools, and there are faithful educated native pastors, catechists, and teachers.

MADU'RA (Sanskrit, sweet), an island, separated by a narrow strait from the n.e. of Java, in 6° 52′ to 7° 17′ s. lat., and 112° 39′ to 113° 9′ e., long., about 90 m. long and 24 broad. It consists of three kingdoms—Madura, west; Pamakasan, middle; and Sumanap, east. The princes are vassals of the Dutch, but Pamakasan only is directly under their rule; and the prince, who is colonel, has a small active army trained by European officers, and maintained at the cost of the Netherlands.

On Dec. 31, 1873, the pop. was 731,321, of whom 719,238 were natives, 478 Europeans, 5,547 Chinese, and 8,383 Arabs, etc. Births, 26,396; deaths, 13,993. The natives are active, honest, brave, and industrious, but quick-tempered and revengeful. They are mostly Mohammedan. They quarry stone, burn lime, make saquerus palm sugar, vegetable oils, mats, and baskets; weave coarse fabrics, make salt; carve wood, fish, and cultivate rice, maize, tobacco, indigo, etc. The rivers are small, and the hills never attain to a great height; Padjūdan, the highest, being 1364 ft. above the sea. In some districts petroleum springs out of the ground, and is burned in lamps. A low chain of limestone hills crosses the island. The exports are sugar, tobacco, indigo, cocoa-nut oil, edible nests, stone, trepang, buffaloes, horses, and horned cattle.

MADURA DISTRICT (*ante*), bounded n. by the district of Trichinopoly and Coimbatoor, e. by Tanjore and Palk's strait, s. by the gulf of Manaar, w. by Travancore. The principal river is Vygah, which after a course of 180 m. falls into Palk's strait. The district has an elevated range of mountains, the highest peak being 7,000 ft. above the level of the sea. The district of Madura has four general divisions, which are subdivided into talooks or counties. In the entire district there are 1015 villages, and a population of 1,306,725. The climate of the hills is mild in summer, but cold in January; that of the plain is dry and hot; the thermometer sometimes reaching 115°. It partakes of the vicissitudes of the two monsoons. The district came into the possession of the English in 1801.

MADVIG, JOHANN NIKOLAI, b. at Svanike, in the island of Bornholm, 1804; was educated at the university of Copenhagen, and obtained there the professorship of the Latin language and literature when he was only 25 years of age. Although his life has been chiefly devoted to philological studies, and to the careful editing of classical works, he has held important official positions in Denmark, where he was minister of public worship in 1848, director of public instruction in 1852, and a member of the diet in 1854. He has published a *Glance at the Constitutions of Antiquity;* a *Latin Grammar for Schools; Adversaria Critica ad Scriptores Græcos et Latinos; The Creation, Development, and Life of Language;* and other works.

MÆANDER (now *Meinder*), the ancient name of a river of Asia Minor, rising near Celænæ, in Phrygia, and flowing in a s.w. direction into the Icarian sea at Miletus. It is noted for its numerous windings—whence the English word *meander*, applied to any stream, signifies to flow in a winding course.

MÆCE'NAS, C. CILNIUS, a Roman statesman, celebrated for his patronage of letters, was b. in the early part of the first century before Christ. His family was of Etruscan origin, and of royal descent (Hor. *Carm.* i 1), perhaps from Porsena. He received an

excellent education, was familiar with Greek and Roman literature, and occasionally did a little in the way of authorship himself. His first appearance in public life dates after the assassination of Julius Cæsar (44 B.C.), when he figures as the friend and adviser of Octavian. He had, it is clear, a talent for private diplomacy, and was employed mainly in that capacity. He "arranged" a marriage between Octavian and Scribonia, made up (temporarily) the differences between Octavian and Antony, and brought about the peace of Brundisium. In 36 B.C. he was in Sicily, helping Octavian, as usual. Five years later, when the latter was fighting the great and decisive sea-battle of Actium with his rival Antony and the Egyptian princess Cleopatra, Mæcenas proved himself a vigilant governor of Rome by crushing a conspiracy of the younger Lepidus, and thereby preventing a second civil war. When Octavian became emperor under the title of Augustus (a step which he is said to have taken by the advice of Mæcenas, who was profoundly impressed with the necessity of a "strong government" to repress the anarchic elements of the period), the latter was appointed administrator of all Italy. The nature and extent of his official power are not very precisely understood, but they were undoubtedly great, though the influence and authority of Mæcenas are to be estimated rather from his intimacy with the emperor than his mere position as a public servant. This intimacy —friendship it might, perhaps, be called—continued uninterrupted for many years; but some time before 16 B.C. it was ruptured from causes which cannot now be ascertained. No enmity, however, ensued. Mæcenas was a thoroughly sincere imperialist. He had a belief in the value of an established government; and when he found that he no longer retained the confidence of his sovereign, he did not lapse into a conspirator; but, as a modern minister might do, retired into the obscurity of private life. Literature and the society of literary men now occupied all his time. He was immensely rich, and kept an open table for men of parts at his fine house on the Esquiline hill. Mæcenas's intercourse with Horace especially was of the most cordial nature, and equally honorable to both. So far as personal morality went, Mæcenas was a thorough pagan—not a bad man in the usual sense of the word, but copiously addicted to sensual delights. His adulteries—if not worse—were the talk of the city; he dressed effeminately, had a passion for theatrical entertainments, paid great attention to cookery, gardening, etc.; and, in short, in his theory of life, was an epicurean of "the baser sort." It does not, therefore, surprise us to find that he was a valetudinarian and a hypochondriac, and that he died childless, 8 B.C. He left the bulk of his property to Augustus.

MAE'LAR, LAKE, one of the largest and most beautiful lakes in Sweden, about 81 m. in length; its average breadth about 13, and its area about 525 sq. miles. It contains upwards of 1200 islands. Its e. end is close by Stockholm, where its waters are poured into the Baltic sea, the difference of level being scarcely six feet. The banks are very much varied with wood, lawn, and cliffs, and are adorned with many castles, country-seats, and villas. They are very fertile, and well cultivated, and upon them are, besides Stockholm, the towns of Enköping, Westeras, Köping, Arboga, Strengnäs, Thorshälla, Mariefried, and Sigtuna.

MAELSTROM. See MALSTRÖM, *ante*.

MAERLANT, JAKOB, 1235–1300; a Dutch poet, regarded as the father of poetry in the Low Countries. His *Heimelijkheid der Heimelijkheden* was published in Dort in 1838; *Wapen Martijn* in Antwerp in 1496 and in Dort in 1834. In 1270 he completed a versified version of the Bible, *Rijmbibel*, published in 1858–60. In 1283 he wrote *Spieghel Historiael*, and among his works is one entitled *Der Naturen Bloeme*, published in Brussels in 1857.

MAESHOWE', an artificial mound with an interior chamber, of unknown antiquity, situated on the main-land of Orkney, about 9 m. in a westerly direction from Kirkwall, and little more than a mile from the famed standing stones of Stennis. Maeshowe is described as follows by Dr. William Chambers in a work (*My Holidays*) privately circulated in 1867: "It is situated in an open, heathy spot; outwardly there is little to be seen—only a circular grassy tumulus, or barrow, as it is called by antiquaries, measuring 36 ft. high, and about 92 ft. in diameter at the base, at which a low door presents itself. Made aware of our errand, a girl from the neighboring farm-house arrives with the key of the door, a couple of candles, and a box of lucifer matches. We have also bits of candles with us; and with the whole lighted, we enter the aperture, crouching as we advance along a passage varying from a width of 2 ft. 4 in. at the entrance, to 3 ft. 4 in. at the opening into the interior chamber. The height, low at first, expands to 4 ft. 8 inches. The passage is formed by slabs of stone, above, below, and along the sides. On issuing into the central chamber, our candles at first feebly enable us to comprehend its dimensions. These we at length discover. We are in a vault built of slabs of stone, measuring 15 ft. square, except at the corners, where there are buttresses. The height is 13 feet. On each of the sides, except that with the entrance, at a height of 3 ft. from the floor, there is a square opening to a cell or recess, the largest of which is 7 ft. in length by 4 ft. 6 in. in breadth. The roof of the vault had originally been constructed with slabs advancing successively layer above layer to the center; but as a result of recent repairs, when the structure was cleared out and restored to something like its former condition, the roof is now partly composed of arched masonry, with an aperture for ventilation. As can be easily supposed, this strange subterranean chamber is cold and

clammy. The slabs of stone are wet with damp, and nothing induces a protracted stay but the wish to examine certain Runic inscriptions and emblematic or fanciful figures carved on a few of the stones. These carvings were discovered only at the opening and repairing the chamber, an operation undertaken at the instance of Mr. James Farrer, M.P., a learned and enthusiastic antiquary. In a privately circulated work on Maeshowe, by Mr. Farrer, and also in a work by Mr. J. M. Mitchell, the carvings have been explained partly through the assistance of Norwegian scholars. All refer to Vikings and other Scandinavian heroes, or to transactions in the middle ages. According to Mr. Farrer's interpretation, it signifies: 'Molf Kolbainson carved these runes to Ghaut'—Ghaut being possibly a comrade who fell in battle. Mr. Mitchell's translation runs thus: 'Tholfe Kobainsson cut these runes (on) this cave.' Such is a pretty fair specimen of the interpretations of the different inscriptions; scarcely two persons agreeing in the signification. [We have reason to believe that the diversity here referred to arises from the fact that imperfect transcriptions of the Runes had been submitted to the foreign scholars who acted as interpreters. We are sorry to learn that damp is likely soon to deface these interesting inscriptions.] Several purport to refer to hidden treasure, a circumstance which throws a degree of ridicule over the whole, for no one carves inscriptions on stones, telling the world where money is secretly deposited. Of the emblematic or fanciful figures, nothing can be made. One is a figure of a horse with an animal like an otter in its mouth, a second is a winged dragon, and a third is a worm knot. These figures may represent the names of ships, or may be whimsicalities signifying nothing.

"There is nothing in these runes to explain the origin or use of the structure. We are left to conjecture that it was erected as a sepulchral vault in extremely remote times; and being opened by Scandinavian rovers, in the hope of discovering hidden treasure, they used it as a resort or hiding-place, and carved the inscriptions which still remain to attest their visits. Obviously the building and the passage communicating with it were erected on the open plain, and then covered with the earth which forms the tumulus. There is at some distance an environing mound and ditch, still pretty entire. The whole structure bears a resemblance to the vaulted tumuli in other parts of the British islands. In one at Newgrange, on the banks of the Boyne, near Drogheda, the walls are composed of tall blocks set on end; whereas, at Maeshowe, the slabs are built one above another (without mortar), as in an ordinary wall. This general resemblance points to a common origin." Capt. Burton's *Ultima Thule* (1875) asserts a resemblance or connection between the runes of Maeshowe and a Syrian cipher called El Mushajjar. For a minute account of Maeshowe, see a paper by Mr. John Stuart, secretary of the Scottish society of antiquaries, 1867.

MAES, or MAAS, NICOLAS, 1632–93; a Dutch painter, pupil of Rembrandt; Acquired a fortune by his skill as a portrait painter at Amsterdam, and his works command a high price to this day. In other lines of painting he also achieved fame, and there is a painting in the Louvre at Paris representing a wife reproaching her husband that exhibits his characteristics as a painter.

MAESTO'SA, a term in music, meaning with majesty or dignity. It is frequently followed by *con gravita*.

MAES'TRI, PIETRO, 1816–71; b. in Milan. He took a prominent part in the revolutionary movements in Italy in 1848, and became one of the heads of the provisional government; afterwards exiled and resident in France till 1859, when he joined the movement of Garibaldi for the unity of Italy. He founded and edited the *Statistica Generale* at Milan in 1861. In 1863 he published *La Francia Contemporanea*. He was connected with the Italian department of the Paris exposition of 1867 and published *L'Italia Economica*, which he continued to edit. He died in Florence, and his native city of Milan honored him with a cenotaph.

MAES'TRICHT. See MAASTRICHT, *ante*.

MAES'TRICHT BEDS. In Britain, the chalk with flints is covered with tertiary strata, but at Maastricht in Holland there occurs a thickness of 100 ft. of soft yellowish limestone, abounding in the remains of corals and bryozoa, sometimes, indeed, entirely made up of them. The fossils are peculiar, and quite distinct from tertiary species. Yet a considerable interval must have elapsed between the deposition of the Maestricht beds and the underlying chalk, for that has been abraded before the deposition of the newer beds. The most remarkable fossil found in these strata is the gigantic marine reptile mososaurus (q.v.).

MAFFEI, FRANCESCO SCIPIONE, Marchese, an eminent Italian author, was b. at Verona, June 1, 1675, and studied in the Jesuit college at Parma. He spent part of his youth in military service, under his brother ALESSANDRO, who greatly distinguished himself in the Spanish war of succession, and who finally rose to the rank of a field-marshal; but his love of literature prevailed over the desire of military renown, and he devoted himself to literary pursuits. He was for some time one of the editors of a critical journal, intended to promote among the Italians an acquaintance with foreign literature. His tragedy of *Merope* (Modena, 1713) was received with great approbation, and went through 70 editions in Maffei's lifetime. His comedy of *La Ceremonia* soon

followed, and was also successful. Maffei was a zealous promoter of the study of the Greek language and literature in Italy, and bestowed much labor on the examination of ancient manuscripts. His *Verona Illustrata* (Ver. 1731–32; new ed. 8 vols. Ver. 1792–93) is a work of much value and learning. He died Feb. 11, 1755. A collective edition of his works was published at Venice in 1790, in 21 vols.

MAFFITT, JOHN NEWLAND, D.D., 1794–1850; b. Dublin; joined the Wesleyan Methodists; came to the United States in 1819, and was received into the New England Methodist Episcopal conference. He was pastor for 12 years of several important churches. In 1831 he removed to New York, and traveled in various parts of the country, lecturing and preaching. In 1833 in connection with the Rev. L. Garrett he founded in Nashville, Tenn., the *Western Methodist*, a weekly journal. He preached extensively as a revivalist, his brilliant eloquence attracting immense congregations. In 1837 he was elected professor of elocution and belles-lettres in the La Grange college, Alabama. This position he held until chosen chaplain to congress in 1841. In 1845 he established at Auburn, N.Y., and edited *Calvary Token*, a literary and religious monthly. He was exceedingly dramatic and emotional in his style both of language and delivery.

MA'FRA, a small t. of Portugal, in the province of Estremadura, 18 m. n.w. of Lisbon. Pop. 3,500. It is remarkable only for its palace and convent, which form an enormously large and most striking edifice. It is 780 ft. in length and 690 ft. in width, contains in all 866 rooms, with 5,200 windows, and about as many doors: 10,000 men, it has been said, could be reviewed on its roof. It was built by king John V. (1717–31), and is splendidly fitted up and decorated. The library contains 30,000 vols., and is 300 ft. in length: its pavement consists of white and red marble; and the book-cases are made of the most costly woods.

MAGADOX'O, or MUKDIS'HA, a commercial t. on the eastern coast of Africa, on the Somali coast, in lat. 2° 2′ north. It was built by the Arabs in 924, for the purposes of trade, and was a flourishing place when the Portuguese first visited it. It now belongs to the imaum of Muscat, whose flag floats above the town. Pop., inclusive of slaves, about 5,000. It exports dhurra, beans, peas, cattle, cotton, spices, etc.

MAGALHA'ENS, DOMINGOS JOSÉ GONÇALVES DE, 1810; b. in Rio Janeiro, of an old Portuguese family; educated a physician. In 1836 he was attached to the Brazilian embassy to Paris. Returning to Rio in 1838 he became professor of philosophy, and then successively member of the chamber of deputies, and ambassador at Naples, Turin, and Berlin. He remained for many years in the latter position. He first published lyric poems in 1832 and subsequently has published from time to time works that have exhibited a constantly improving genius, and tendency to philosophical speculation. His *Mysterios* is one of the most esteemed of his works. *Antonio José* and *Olgiato* are two tragedies dealing with facts in the history of Brazil, and have been used on the stage. His most popular work in Brazil is entitled *A Confederaçao dos Tumoyos*, published in Rio Janeiro in 1857. It is a vivid picture of the defense of the Indians against the Portuguese, describes the founding of the city of Rio Janeiro, and is considered the national lyric of Brazil.

MAGALHA'ENS, or MAGELLA'NES, FERNANDO. See MAGELLAN, *ante*.

MAGALHA'ENS, FRAY GABRIEL DE, 1609–77; b. at Pedrogao, Portugal; united with the order of Jesuits at 16 years of age; sent as a missionary to India in 1634. In 1640 he set out for Japan, but having stopped at Macao he concluded to explore the interior of China. Having studied the Chinese language at Macao, he went to the western province of Szechuen, where he met with great success as a Christian teacher. A rebellion in the province while he was there exposed him to great peril, but nothing worse happened to him than to be wounded on one occasion by an arrow. He accompanied the victorious imperial army to the capital in 1648, where he gained the favor of the emperor and was permitted to build a church. But on the accession of a new emperor he was subjected to persecution, twice put to torture, and condemned to death, from which he escaped by the intervention of the regency. Three years later he was again arrested and ordered to leave the country; but an earthquake at the time caused a panic which diverted attention from him, and he remained in the country until his death at Pekin, when he was honorably buried by the emperor's order. He was of the same family as the great navigator, and his work in the French language, entitled *Nouvelle Relation de la Chine, contenant la Description des Particularités les plus Remarquables de ce Grand Empire*, is very highly esteemed by scholars.

MAGAZINE (a word derived from the Arabic *makhzan*), literally means any place where stores are kept; but as a military expression magazine always means a *powder-magazine*, although arms may at times be kept in it. A magazine may be a depot where vast quantities of gunpowder are held in reserve, an entrepôt for the supply of several advanced works, a battery magazine for the wants of a fortress during a siege, or merely an expense magazine for the daily requirements of the special battery in which it may be situated. The last is usually temporary, and hollowed out in the back of the rampart; but the other forms require most careful structure. They must be bomb-proof, and therefore necessitate very thick walls; they must be quite free from damp; and they should admit sufficient daylight to render the use of lanterns within generally

unnecessary. Magazines are commonly built of brick, the solid masonry being arched over within, and a thickness of earth sometimes added above the brick-work to insure impermeability to shells. The entrance is protected by shot-proof traverses, lest an opening should be forced by ricochet shots. Within, a magazine is divided into bins or compartments, and one of these should always be kept empty in order that the barrels of powder may frequently be moved from one place to another, a process necessary to keep it in good condition. A battery magazine commonly contains 500 rounds for the guns dependent on it. Depot magazines should, when possible, be limited to 1000 barrels of powder.

In a ship the magazine is strongly built in the hold; it is divided by a transparent screen from the *light-room*, in which are kept properly provided lanterns, the introduction of fire in any form into the magazine itself being absolutely forbidden. The explosion of the magazine is, of course, equivalent to the destruction of the ship, and therefore means are devised by which, on the least appearance of fire in its vicinity, the magazine may be immediately flooded.

The term magazine has been applied to a well-known class of periodical publications, usually issued monthly, and containing miscellaneous pieces in prose and verse, to which at one time was appended a chronicle of public events. The oldest of this class of works is the *Gentleman's Magazine*, begun by Edward Cave in 1731.

MAGAZINE GUNS. See BREECH-LOADING GUNS.

MAGDA'LA, a t. of Abyssinia, about 120 m. s.e. of Gondar, on the left bank of the Bachilo, a feeder of the Blue Nile, at an elevation of about 9,000 ft. above the level of the sea, and within a few miles of the mountains of the Falla country, the peaks of which are covered with snow for nine months of the year. Magdala was a small town, having a pop. of only 3,000 or 4,000, but it recently acquired note as the place of residence of the negus or king of Abyssinia, and as the place of captivity of the British prisoners, for whose rescue an expedition was at last sent out, in 1867, by the British government. Its rock fortress, approachable only by a narrow path up a steep ascent of 300 ft., and through a double line of defense, was regarded by the Abyssinians as impregnable; but it was forced, after a short but brave defense on the part of the few attendants who up to the last remained faithful to Theodore, on April 13, 1868. The town was found to be of the meanest description, the church and royal palace being in nowise exceptions to the prevailing dirtiness. The wealth of Magdala was insignificant. Before the departure of the English troops the town was burned and its defenses thoroughly destroyed.

MAGDA'LA, in Galatia, probably the birth-place of Mary Magdalene, i.e., Mary of Magdala. The name signifies tower or castle. It was on the lake Gennesaret, on the western shore. After the destruction of Jerusalem it was a seat of Jewish learning, and the rabbins of Magdala are often mentioned in the Talmud. A small Moslem village, now found on the shore of the lake, 3 m. w. of Tiberias, is supposed to represent the Magdala of Scripture.

MAGDALE'NA, the principal river of the United States of Colombia, South America, has its origin in a mountain lake at the s. extremity of the eastern Cordilleras. After a northern course of 900 m. it falls into the Caribbean sea, in lat. 11° n., long. 75° west. Of its course, the upper portion is rapid, and interrupted by many cataracts; the lower portion is through a great plain. It is navigable to Honda, 540 m. from its mouth; chief affluent, the Cauca. The area drained by the Magdalena is estimated at 110,000 sq. miles.

MAGDALE'NA, a state of Colombia, on the Caribbean sea, having Venezuela on the e., Santander on the s., and Bolivar on the w.; 26,950 sq.m.; pop. '70, 85,255. The surface is varied with mountains and valleys in all parts; the country is watered by the river Magdalena and its branches. The climate is severe, the temperature being generally oppressively warm. Yellow fever occurs at the sea-ports. The productions are tropical fruits, rice, cotton, coffee, sugar, tobacco, and cacao. Gold is found in the interior.

MAGDALEN COLLEGE, Oxford; in full, the college of St. Mary Magdalene. William Patten, commonly called Waynflete, from the place of his birth, successively head master of Winchester, head master and provost of Eton college, bishop of Winchester, and at the same time lord high chancellor, founded the hall of St. Mary Magdalene in 1448. In 1457 he obtained a license from the king to found a college, into which he transferred the president and scholars of the hall. Magdalen is in many respects the most remarkable college in Oxford, and Wood declares it to be "the most noble and rich structure in the learned world, that is to say, that if you have regard to its endowment, it excelleth, all things considered, any society in Europe." There were on the original foundation a president, 40 fellows, 30 scholars called demies, 4 chaplains, and 16 choristers. The fellowships and demyships were confined to certain specified dioceses and counties. By ordinances passed under the powers of 17 and 18 Vict. c. 81, the constitution of the college has been considerably changed. Certain statutable restrictions on fellowships and demyships are abolished. The demyships are of the value of £95 per annum, and 10 are to be added to the statutable number. Twenty

exhibitions of the same value were at the same time founded. Four professorships—of moral philosophy, chemistry, mineralogy, and physical geography—of the value of £600 per annum, are to take the place of three lectureships—of divinity, moral philosophy, and natural philosophy, which were founded by Waynflete. In order to carry out these changes, ten of the fellowships are suspended. By the same ordinance it is directed that the fellowships are not to exceed £300 per annum, exclusive of rooms. This college is one of great beauty, and, as is well known, is rich in historical associations. It has 41 benefices in its gift.

MAG'DALENE, MARY, or MARY OF MAGDALA, so named from a town on the sea of Galilee, a woman "out of whom Jesus cast seven devils," and who believed in him and followed him. She was one of the women who stood by his cross, and one of those who went with sweet spices to the sepulcher. To her he first appeared after his resurrection. In consequence of an unfounded notion identifying her with the woman mentioned in Luke vii. 36–50, who anointed our Lord's feet with ointment, and wiped them with the hairs of her head, Mary Magdalene has been long and generally regarded as a woman whose early life had been very profligate, although of this there is no hint whatever in the narratives of the evangelists; and the Magdalenes so frequent amongst works of art represent her according to this prevalent opinion. The very name Magdalene has come to be applied to women who have fallen from chastity, and institutions for the reception of repentant prostitutes are known as *Magdalene asylums.* See PENITENTIARIES.

MAGDALENE COLLEGE, Cambridge, was founded in 1519 by Thomas, baron Audley of Walden, who left for this purpose the impropriate parsonage of St. Catherine Cree church, London, and also a considerable part of the city, anciently called Covent garden, Christ church. It has eight open fellowships on the foundation. Four of the fellowships are named after persons who have made benefactions to the college—Spendluffe, Wray, Drury, and Millington. Magdalene college has 12 scholarships—3 of £60, 3 of £40, and 6 of £20 each—all of which are likewise named after their founders; besides 13 exhibitions, 5 of which are for scholars from Shrewsbury school, 4 for scholars from Wisbeach school, and 4 for scholars from Leeds, Halifax, and Heversham schools. There is also an annual benefaction, called the Pepysian, worth £50, in the gift of the master, and generally bestowed by him upon poor and deserving students. Magdalene college, in 1879, counted 62 undergraduates, 129 members of the senate, and 228 members on the boards.

MAGDALEN HALL, Oxford. This hall was founded at the same time as Magdalen college. Up to 1602 it was a sort of school for students, previous to admission to the college, and was governed by one of the college fellows. It then became an independent hall, and in 1822 was removed to the seat of the former Hertford college. This hall presents to one benefice, and possesses 8 scholarships and 4 exhibitions, all tenable for 3 years.

MAGDALEN ISLANDS, a small group near the center of the gulf of St. Lawrence, 54 m. n.w. of Cape Breton island, and about the same distance n. from Prince Edward's island. They consist chiefly of Coffin, Amherst, and Grindstone islands, with about 2,000 inhabitants, who are supported by the productive cod, herring, and seal fisheries of the neighboring waters.

MAGDEBURG, chief t. of Prussian Saxony, is situated in 52° 8′ n. lat., and 11° 40 e. long., has a pop. '75, of 122,789 (including its suburbs and its citadel), and is one of the most strongly fortified and most important commercial towns of Prussia, and the focus of four of the principal lines of railway in Germany. It lies on the left bank of the Elbe, and is surrounded by extensive suburbs, known as Neustadt and Sudenburg, but with the exception of one long and wide thoroughfare, the *Breite Weg* (Broadway), it consists mostly of narrow and crooked streets. Magdeburg is the seat of the governmental courts of appeal and administration, and of a superintendent-general of the evangelical church. It has two gymnasia, a normal school, institutions for the deaf and dumb, and blind; schools of arts, trades, practical mining, medicine, surgery, and midwifery; and is well provided with institutions for the promotion of charitable purposes. Its most remarkable buildings are the cathedral, built between 1208 and 1363, and containing the graves of the emperor Otho, the founder of the city, and of his first wife, the English princess Editha, and the sarcophagus of archbishop Ernest, sculptured in 1497 by P. Vischer of Nuremberg; the town hall, in front of which stands the memorial of Otho the great, erected after his death, in 973, by the magistracy of Magdeburg, in grateful remembrance of the favors which he had conferred upon the city; the government house, the barracks, and the theater. The industrial products of Magdeburg embrace silk, cotton, and woolen goods, gloves, ribbons, and leather, and it has manufactories of tobacco, chicory, lead, sugar, and vinegar, and extensive breweries and distilleries. The transit and commission trade is very considerable; there are annual wool and other markets; and trade is facilitated by rail, and by steam and canal navigation. In 967 Magdeburg was raised to the dignity of being selected by pope John XIII. as the see of the primate of Germany, while it had already acquired the rights of a free city under Charlemagne. During the middle ages, the archbishops and the magistracy were frequently at war; and Magdeburg early adopted the reform doctrines, and thus

brought upon itself the combined wrath of the emperor and the archbishops. Its greatest troubles are, however, connected with the thirty years' war, when, after sustaining a siege for 28 weeks against the imperialists, under Tilly, the city was taken, sacked, and nearly burned to the ground; the cathedral and about 150 houses being all that remained after the three days' sack to which it had been exposed. Thirty thousand of the inhabitants were slain, and numbers threw themselves into the Elbe, to escape the fury of the invaders. In 1648 the archbishopric was converted into a secular duchy, and conferred upon the house of Brandenburg in compensation for the loss of Pomerania. In 1806 it was taken by the French and annexed by them to the kingdom of Westphalia; but finally restored to Prussia in consequence of the downfall of Napoleon. in 1814.

MAGDEBURG CENTURIES, the name given to the first comprehensive work of Protestant divines on the history of the Christian church. It was so called because it was divided into centuries, each of which occupied a volume, and because it began to be executed at Magdeburg (q.v). The originator of the work was Matthias Flacius (1552), and the purpose he had in view was to demonstrate the identity of the Protestant doctrines with those held by the primitive church, and the departures of the Roman Catholic church from the same. Joh. Wigand, Matt. Judex, Basilius Faber, Andr. Corvinus, and Thom. Holzhuter were Flacius's principal fellow-laborers; and several Protestant princes and noblemen defrayed the heavy expense incurred in the preparation of the work. The writers, who are called *centuriators*, brought their work down only to the year 1300. It was published at Basel (13 vols. 1559–74); Baumgarten and Semler began a new edition (6 vols. Nuremberg, 1758–65). The *Magdeburg Centuries* displays great learning, accuracy, and sound judgment. The Roman Catholic historian Baronius (q.v.) wrote his *Annales Ecclesiastici* as a reply to it.

MAGDEBURG HEMISPHERES are two hollow hemispheres, generally made of copper or brass, with their edges accurately fitted to each other, and one of them furnished with a stop-cock. When the edges are rubbed over with grease, pressed tightly together, and the globe thus formed exhausted of air through the cock, the hemispheres, which fell asunder before exhaustion, are now pressed together with immense force; e.g., if they are one foot in diameter, they will, after exhaustion, be pressed together with a force of nearly a ton. This experiment was first performed by Otto von Guericke (q.v.) in 1650 at the imperial diet at Ratisbon, to the astonishment of the emperor Ferdinand III. and his princes and nobles.

MAGEE, WILLIAM, D.D., 1766–1831; b. Ireland; graduated at the university of Dublin, 1785; obtained a fellowship three years after, and gave instruction while preparing for the ministry; took orders in the church of England 1790; some years after was chosen, in the university of Dublin, assistant professor of oriental languages; became senior-fellow and professor of mathematics 1806; retired from the university 1812, to the parishes of Kappagh and Killyleagh; was made dean of Cork 1814, where he excelled as a sacred orator; was appointed bishop of Raphoe 1819, and archbishop of Dublin 1822. He was a zealous Protestant and Trinitarian. Of his writings, the *Discourses on the Atonement and Sacrifice*, first published in 1811, and afterwards in many editions, have been most widely known and highly esteemed.

MAGEE, WILLIAM CONNOR, D.D., b. Ireland, 1821; educated at Trinity college, Dublin; became a curate in Dublin, and, in 1848, of St. Saviour's, Bath; incumbent of Octagon chapel, Bath, 1850; was active in organizing the church defense society; minister of Quebec chapel, London, 1860; rector of Inniskillen 1861; dean of Cork 1864; and, soon after, dean of the chapel royal, Dublin; and bishop of Peterborough 1806. Eloquent and popular as a speaker, he has preached on public occasions in different parts of Great Britain, and in the debates in the house of lords was especially active in opposing the disestablishment of the Irish church.

MAGELLAN, or (properly) **MAGALHAENS,** FERNANDO DE, a famous voyager, was born in Oporto, of good family, towards the latter half of the 15th century. He served with distinction under Albuquerque in the East Indies; but, thinking his services ill rewarded by the Portuguese court, he went, in 1517, to Spain with his countryman Ruy Falero, a geographer and astronomer. They laid before Charles V. a scheme for reaching the Moluccas by the w., which was well received by him; and Magellan sailed on Sept. 20, 1519, with 5 ships and 236 men, from San Lucar, and proceeding to the mouth of the La Plata, and along the shores of Patagonia, he discovered and sailed through the strait which bears his name; discovered the southern Pacific ocean, to which he gave that name upon account of the fine weather which he experienced there; reached the Philippine isles, and fell in a fight with the chief of the isle of Matan, April 26, 1521. His ship was safely carried home to Spain, and thus completed, Sept. 6, 1522, the first voyage ever made round the world. The complete narrative of Magellan's voyage was edited by Amoretti. See also *The First Voyage round the World by Magellan*, by lord Stanley (1875).

MAGEL'LAN, or **MAGALHAENS,** STRAIT OF, separates South America on the s. from Terra del Fuego. It is 300 m. in length; its breadth varies from 5 to 30 m.; and the

navigation is difficult. It was discovered in 1520 by Magalhaens, the Portuguese navigator, and took its name from him.

MAGELLAN, STRAIT OF (*ante*). Since steamships have been used for long voyages the strait of Magellan has acquired a new importance. On account of its fogs, precipitous shores, numerous hidden rocks, and sudden squalls, it had come to be avoided by sailing vessels, which found the circuit of cape Horn far less perilous. Careful observations, made by the steamers of many nations in its passage, have been recorded to an extent that makes it at the present time comparatively safe for steamers. Entering from the east through Desolation bay, its shores are low, reddish, and sandy. Further in, the strait varies in width from ¼ of a mile to 15 miles, and as the center is reached the shores become precipitous, conveying the impression that they had once joined, and had been parted by some great convulsion of nature. Their height varies from a few feet to many hundred, with high mountains rising behind them on the n. side, and round-topped hills on the s. or Terra del Fuego side. The most direct passage through to the Pacific is at cape Pillar, a point nearly s.w. of the entrance on the Atlantic, where lofty rocks on each side of a passage less than a mile wide form a gateway to the open Pacific. Sandy point, on the n. shore, lies about midway of the strait, and is the only settlement of whites. The Chilian government here has a penal colony. Port Famine, the scene of a sad tragedy of starvation nearly 300 years ago, lies to the west. North of the cape Pillar channel the strait opens by innumerable passages through an archipelago of barren rocky islands to the Pacific. But the channel now generally taken is an inland one from the strait on the s. by a passage known as Smyth's channel, about 350 m. long, to the stormy gulf of Penas on the n., where it connects with the open sea. The most picturesque and alpine part of the scenery of the strait is near the w. end, where lofty snow-covered ranges, cloven peaks, great glaciers, and valleys filled with somber forests, as seen from passing steamers, form a changing panorama of unique beauty. Mrs. Agassiz has described it vividly in the *Atlantic Monthly* of Jan., 1873. The scientific expedition of which Agassiz was the leader spent several months in the strait in 1871, and its reports are the fullest ever made, not only of their general features, but also of their scientific bearings. Mrs. Agassiz speaks of banks of wild fuchsias found in bloom there in March, which indicates that, however low the average temperature, the extreme, by the sea-side, is not low. Chili now claims the country contiguous to the straits, though Paraguay disputes the claim. The natives of Patagonia on the n. side and of Terra del Fuego on the s. are widely different; the former being noted for their great stature and good forms, and the latter for small size, bad forms, and degraded condition. Seals are found in abundance in the strait, but not the species bearing the most valuable fur. Besides recent works and reports on the strait already alluded to, the *Voyage round the World* by Charles Darwin, reprinted, New York, 1878; *Adventures in Patagonia*, by rev. T. Coan, 1880; and *Les Naées Magellanique*, by Duboc, Paris, 1853, are among the most instructive.

MAGENDIE, FRANÇOIS, an eminent French physiologist and physician, was b. at Bordeaux in 1783, and d. in Paris in 1855. Through the influence of his father, who practiced as a physician in Paris, he became a pupil of Boyer, the celebrated anatomist. At the age of 20, after an examination by Concours, he was appointed prosector in the faculty of medicine, and soon afterwards a demonstrator. He was subsequently appointed physician to the Hôtel-Dieu. In 1819 he was elected a member of the academy of sciences, and in 1831 succeeded Recamier in the chair of anatomy in the college of France.

Magendie's chief physiological works are: *Précis Elémentaire de Physiologie* (1816), which went through several editions, and was enlarged into the *Elémens de Physiologie*, which was translated into English, and was for many years the best work on physiology in this language; *Leçons sur les Phénomènes Physiques de la Vie* (1836–42); *Leçons sur le Sang* (1839); *Leçons sur les Fonctions et les Maladies du Système Nerveux* (2 vols. 1839); and *Recherches Philosophiques et Cliniques sur le Liquide Cephalo-rachidien ou Cerebro-spinal* (1842). He was likewise the founder, and for ten years the editor of the *Journal de la Physiologie Expérimentale*, in which are recorded many of the experiments on living animals which gained for him, too deservedly, the character of an unscrupulous vivisector.

He was the first to prove experimentally that the veins are organs of absorption; he gave a more accurate account of the process of vomiting than had been previously given; he pointed out that non-nitrogenous foods are non-nutritious, and that an animal cannot live solely on any one kind of food, however nitrogenous it may be; he investigated the physiological action and therapeutic uses of hydrocyanic acid and strychnine; he performed an important series of experiments on the cause of death when air is admitted into the larger veins; he made numerous experiments to determine the functions of various nerves and of different parts of the brain; and lastly, he shares with sir Charles Bell the honor of having discovered the separate functions of the two roots of the spinal nerves.

MAGEN'TA, an Italian town, in the province of Milan, on the high-road and railway from Novara to the city Milan, from which it is distant 12 miles. Pop. 5,100. Its district yields excellent wine and an abundance of mulberries. In the campaign of 1859

Magenta was the scene of a decisive victory won by the French and Sardinians over the Austrians. It has given its name to one of the colors derived from coal-tar. See DYE-STUFFS.

MA'GEROÉ, the most northerly of the larger European islands, belongs to Norway, and lies close to the coast of Finmark, in the Arctic ocean. It terminates on the n. in North cape, 970 ft. in height, and situated in lat. 71° 10′ n., long. 25° 50′ east. Mageroé is 22 m. in length and 15 m. in breadth, is irregular in shape, and deeply indented by bays. It supports a few Norwegian and Lappish families.

MAGGIO'RE, LAGO, one of the largest lakes in Italy, the *lacus Verbanus* of the Romans, is situated for the most part in Italy, but also partly in the Swiss canton of Ticino. It is about 36 m. in length, and its greatest breadth is about 8 miles. It lies 650 ft. above the level of the sea, and in some places is 2,500 ft. deep. The river Ticino flows through it. In a south-western expansion of the lake are the Borromean isles (q.v.). On the n. and w. it is surrounded by granitic mountains; on the s. and e. by vineyard-covered hills. See also LAGO MAGGIORE.

MAGGOT, the popular name of the larvæ of many kinds of dipterous insects, particularly those of the great family *muscidæ* (flies), although it is often also given to those of *œstridæ* (bot-flies, etc.). It is more commonly given to those larvæ which feed on animal than to those which feed on vegetable substances, and particularly to those—of which there are very many species—which feed on putrescent animal matter. *Corpse-worms* are the larvæ of *sarcophaga mortuorum*, a fly which is always ready—at least in Europe—to lay its eggs in human bodies when deposited in open vaults. Maggots of the flesh-fly (q.v.) are used to feed pheasants and as fish-bait, and to procure them in abundance, dead bodies of animals are often exposed to putrefaction in the open air.

MAGHADA, one of the kingdoms of India when Alexander the great invaded the country, B.C. 400. It comprised the greater part of southern and central India, and lasted till about A.D. 450. Its capital was Palibothra on the Ganges, and is supposed to have occupied the site of the present Patna. Seleucus, one of Alexander's generals, to whom Bactria was given, which included the provinces on the Indus, attempted conquests beyond that river, and was involved in war with Chandragupta, king of Maghada, called by the Greeks Sandracottus, 312–280. His grandson Asoka, B.C. 250, extended his empire and the Buddhist religion over the larger part of India.

MA'GI. The origin of this term has recently been brought to light by Assyrian scholars. In Accadian, the language of the early Scythian or Turanian inhabitants of Babylonia and Media, *imga* signifies "august," "reverend," and was the title of their learned and priestly caste. These Accadians had made great advances in astronomy, or rather astrology, and were much addicted to divination and similar mysterious arts. The Semitic nations, afterwards dominant in Babylonia and Assyria, adopted not only the learning and many of the religious observances of the early inhabitants, but also a number of the special forms, and among others the name for the learned caste, modifying it to suit their own articulation; and out of the Semitic form the Greeks made *magos*. Under the Persian empire the magi rose to the very highest importance. They were not only the "keepers of the sacred things, the learned of the people, the philosophers and servants of God," but also diviners and mantics, augurs and astrologers. They called up the dead, either by awful formulas which were in their exclusive possession, or by means of cups, water, etc. They were held in the highest reverence, and no transaction of importance took place without or against their advice. Hence their almost unbounded influence in private as well as in public life, and, quite apart from the education of the young princes being in their hands, they also formed the constant companions of the ruling monarch. Of their religious system itself, the articles GUEBRES and PARSEES will give a fuller account. Zoroaster (q.v.), *Zerdusht*, reorganized, in the course of his great religious reform, also the body of the magi, chiefly by reinforcing the ancient laws about their manner and mode of life, which was to be one of the simplest and severest, befitting their sacred station, but which had become one of luxury and indolence, and by reinstituting the original distinction of the three classes of *herbeds* (disciples), *mobeds* (masters), and *destur mobeds* (complete masters). The food, especially of the lower class, was to consist only of flour and vegetables; they wore white garments, slept on the ground, and were altogether subjected to the most rigorous discipline. The initiation consisted of the most awful and mysterious ceremonies. Purifications of several months' duration had to precede it, and it was long before the stage of the disciple's "being led into the realms of the dead" was proceeded with.

Gradually, however, their influence, which once had been powerful enough to raise them to the throne itself (Sassanides), began to wane, and if formerly a number of 80,000 delegates of magi had to decide on the affairs of state and religion, this council in later times dwindled down to the number of seven; and from being the highest caste, the priests of God, and the "pure of mind, heart, and hand," they fell to the rank of wandering jugglers, fortune-tellers, and quacks, and gave the name to the art of sleight-of-hand and performance of conjuring tricks.

MAGIC (see article MAGI) is a general name for wonderful effects produced in some mysterious way. Medicine in its early form is intimately allied to magic. It would soon be discovered by accident that certain plants produced powerful effects, both good and bad, upon the bodies of men and animals; and the reverence arising from their real virtues would lead to ascribing to them all manner of imaginary ones. The laws of nature being little known, one thing was not more incredible than another; and effects were assigned to causes in the most arbitrary and accidental way. The Rosicrucian physicians treated a case of wounding by applying the salve to the weapon instead of to the wound itself; and this may be taken as the type of magical as contrasted with rational medicine. In modern times drugs are mostly drawn from the mineral and vegetable kingdoms; but while the healing art was in the mystic stage, animal substances were most esteemed. If the juice of a plant could affect the living body, how much more must the life-blood of another animal! And the rarer the kind of blood, so much the rarer the virtue. The blood of an innocent child, or of a virgin, was believed to cure the leprosy; that of an executed criminal, the falling sickness. The hearts of animals, as being the seat of life, were held to be potent drugs. The fat of a hog had been found by experience to benefit a sore; what virtue, then, must there be in human fat, with the solemn mysteries of the grave about it!

In early stages of society women are the doctors; while the men fight and hunt, the women gather herbs and decoct salves for their wounds; and the art would naturally become a sort of profession in the hands of the older women who had a reputation for superior skill of that kind. Mostly a blind groping—a mystery to themselves as well as others—their operations were looked upon with awe. The "wise woman" with her kettle, cooking her mysterious broth, adding ingredient after ingredient (for the more, the rarer, the horribler they were, would not the compound be the more efficacious?), inspired not only hope but fear; for the art might be, and doubtless was, used to hurt as well as to heal. Roman matrons were often accused and convicted of poisoning by their decoctions; and during seasons of pestilence these female druggists were persecuted with indiscriminate fury, as were witches afterwards in Europe. So much was the notion of poisoning uppermost in the Roman mind respecting them that *venefica*, literally "a poison-maker," was the general name for a preparer of magic medicines, an enchantress or sorceress—the corresponding character to our witch. See WITCHCRAFT.

The operation of magical medicines was not, as is the case with those of the modern pharmacopœia, confined to physical effects on living bodies to which they were applied; associated with incantations and other ceremonies, as they always were, they could be made to produce almost any desired effect—raise or lay storms; fertilize a field, or blast it; kill or cure a man, absent as well as present; and give the power of predicting future events. How a belief in imaginary virtues of things may grow out of the experience of their real virtues is indicated by Dr. Livingstone, when speaking of the belief in rain-making among the tribes in the heart of southern Africa. The African priest and the medicine-man is one and the same, and his chief function is to make the clouds give out rain. The preparations for this purpose are various—charcoal made of burned bats; internal parts of animals, as lions' hearts and hairy calculi from the bowels of old cows; serpents' skins and vertebræ; and every kind of tuber, bulb, root, and plant to be found in the country. "Although you disbelieve their efficacy in charming the clouds to pour out their refreshing treasures, yet, conscious that civility is useful everywhere, you kindly state that you think they are mistaken as to their power; the rain-doctor selects a particular bulbous root, pounds it, and administers a cold infusion to a sheep, which in five minutes afterwards expires in convulsions. Part of the same bulb is converted into smoke, and ascends towards the sky; rain follows in a day or two. The inference is obvious." The religion of this part of Africa may be characterized as medicine-worship. In a village of the Balonda, Dr. Livingstone saw two pots with charms or medicines kept in a little shed, like idols in a niche. For an idol they sometimes take a piece of wood, and carve a human head on it, or simply a crooked stick, when there is no professed carver to be had; but there is nothing divine about it until it is dotted over with a mixture of medicine and red ocher. Packets of medicine are worn as charms about the person, to ward off evils of all kinds. The female chief Manenko was hung all over with such charms; and when she had to cross a river, her traveling-doctor waved medicines over her, and she took some in her hand, to save her from drowning.

During the middle ages, and down almost to the 18th c., magic was greatly studied in Europe, and could boast of distinguished names, who attempted to treat it as a grand and mysterious science, by means of which the secrets of nature could be discovered, and a certain godlike power acquired over the "spirits" (or, as we should now say, the "forces") of the elements. The principal students and professors of magic during the period referred to were pope Sylvester II., Albertus Magnus, Roger Bacon, Raymond Lully, Pico della Mirandola, Paracelsus, Cornelius Agrippa, Trithemius, Van Helmont, and Jerome Cardan. See Horst's *Von der Alten und Neuen Magie, Ursprung, Idee, Umfang und Geschichte* (Mentz, 1820); and Ennemoser's *Geschichte der Magie* (2d ed. Leip. 1844; translated into English by W. Howitt, 2 vols. Lond. 1854). For an interesting account of the discipline and ceremonies of the "art," consult the *Dogme et Rituel*

de la Haute Magie (Paris, 1856), by Levi; and *Histoire de la Magie*, by Christian (Paris, 1870).

Some of the different forms which the belief in magic has assumed will be seen under AMULET, AUGURIES AND AUSPICES, DIVINATION, INCANTATION, and WITCHCRAFT, and the allied subjects of ALCHEMY and ASTROLOGY.

MAGIC LANTERN, an optical instrument by means of which magnified images of small pictures are thrown upon a wall or screen. The instrument consists of a lantern containing a powerful argand lamp; in the side of the lantern is inserted a horizontal tube, on a level with the flame, and the light is made to pass through the tube by reflection from a concave mirror placed on the opposite side of the lantern. The tube is furnished with two lenses, one at each end; the inner one is a hemispherical illuminating lens of short focus, to condense a strong light on the picture, which is inserted into the tube, between the lenses, through a transverse slit. The other end of the tube is fitted with a double convex lens, which receives the rays after passing through the picture, and throws them upon the screen or wall. The pictures are formed with transparent varnish on glass slides, and must be inserted into the tube in an inverted position, in order that the images may appear erect. If the screen on which the image is thrown be at too great a distance, the image will become *indistinct* from the lessened intensity of the light, and *distorted* by the increasing spherical and chromatic aberration, though this latter defect may be obviated by the use of a screen of the same curvature as the outside surface of the lens. This instrument is generally used as a toy, but is also occasionally employed to produce enlarged representations of astronomical diagrams, so that they may be well seen by an audience. Phantasmagoria, dissolving views, etc., are produced by a particular manipulation of the same instrument.

MAGIC SQUARES, a species of puzzle which occupied the attention of many celebrated mathematicians from the earliest times down to the 18th century. The magic square is a square divided by lines parallel to the sides into a number of smaller equal squares or cells, in which are inserted numbers which form the terms of one or more progressions (generally arithmetical), in such an order that each line of numbers, whether added horizontally, vertically, or diagonally, shall amount to the same sum. This arrangement is effected in three different ways, according to the number of cells in the side of each square, and can be most easily effected when this number is *odd*, or *evenly even* (divisible by 4), but becomes a problem of considerable difficulty when the number of cells is *oddly even* (divisible by 2, and not by 4). The following are examples of the first two methods:

13	3	2	16
12	6	7	9
8	10	11	5
1	15	14	4

9	2	25	18	11
3	21	19	12	10
22	20	13	6	4
16	14	7	5	23
15	8	1	24	17

The arrangement for the oddly even squares is the same as that for the evenly even ones, with the exception of a few transpositions. The only exception is when the number of squares or cells is four. Dr. Franklin invented a similar puzzle to this, called the "magic circle." See *Hutton's Recreations in Mathematical Science*, vol. i.

MAGILP', or MEGGELLUP, a composition used by artists in oil-colors as a vehicle for their "glazes." It is made of linseed oil and mastic varnish, and is thinned with turpentine as required for the painting.

MA'GILUS, a very curious genus of gasteropodous mollusks, of the order *tubulibranchiata*, inhabiting the Red sea and the Indian ocean. They have, at first, shells of the ordinary form of spiral univalves, and establish themselves in little hollows of madrepores, where they remain, enlarging the shell into a long tube as the madrepore grows, and thus preventing themselves from being shut in. The tube is sometimes 3 ft. long, and the animal deserts entirely the spiral part of the shell, and lives in the mouth of the tube, which it closes against danger by an operculum, the upper part being wholly or partially filled up with solid matter.

MAGINDANAO, or MINDANAO. See PHILIPPINE ISLANDS, *ante*.

MAGINN', WILLIAM, LL.D., 1793–1842; b. in Cork, Ireland, d. at Walton on Thames, near London. In youth he had such precocity of talent that he was admitted to Trinity college at the age of ten. He became a valued contributor to *Blackwood's Magazine;* a Paris correspondent in 1824; editor of the *London Standard* in 1828; of

Fraser's Magazine in 1830; of the *Lancashire Herald* in 1839, and the *Magazine of Miscellanies* in 1840; and was an occasional contributor to the *Quarterly Review, Bentley's Miscellany,* and *Punch.* His style was noted for its brilliancy and wit. A collection of his works was published in the United States, 1855–57, in 5 vols., edited by Dr. R. S. Mackenzie.

MAGISTRATE. See JUSTICE OF the PEACE.

MAGLIABECHI, ANTONIO DA MARCO, an Italian scholar of extraordinary attainments, and court librarian, b. at Florence in 1633, of a respectable but indigent family. From his earliest years he displayed an inordinate passion for the acquisition of book-knowledge. Having speedily mastered the Greek, Latin, and Hebrew languages, he literally entombed himself among books, of which disorderly piles encumbered every portion of his dwelling, and lay in a heterogeneous litter around his feet. In his daily habits Magliabechi grew regardless of the requirements of social and sanitary life; and such was his avidity of study that he finally denied himself even the requisite intervals of repose. His memory was prodigious, and not only enabled him minutely to retain the contents of his multitudinous books, but also to supply, on occasion, the most exact reference to any particular page or paragraph, the place of each book being indicated with precision in the midst of their apparent inextricable masses. Magliabechi was regarded as the literary prodigy of his times. He was appointed court-librarian by the grand dukes of Florence; and the many tributes of respect tendered by royal and distinguished personages to his wonderful erudition, fostered in an inordinate degree his love of fame and praise, which rendered him intolerant of literary merit in others, and involved him in several bitter literary squabbles. He died at Florence on July 12, 1714, in the 81st year of his age, leaving no written record of his immense encyclopædic knowledge. His valuable library of 30,000 vols. he bequeathed to his native city of Florence, with funds for its future care and extension; it is now a free library, and bears the name of its collector.

MAGNA CHARTA, the great charter which was granted by king John of England to the barons, and has been viewed by after-ages as the basis of English liberties. The oppressions and exactions of a tyrannical and dastardly sovereign called into existence a confederacy of the barons or tenants-in-chief of the crown, who took up arms for the redress of their grievances. Their demand was for the restoration of the laws of Henry I., laws which might probably be characterized as an engrafting of Norman feudalism on the "ancient custom of England," or previously existing Saxon and Danish free institutions, in which "ancient custom" were comprehended the laws of Edward the confessor. A conference between the sovereign and the barons was held at Runnymede, near Windsor, a place where treaties regarding the peace of the kingdom had often before been made. King and barons encamped opposite each other; and after several days' debate John signed and sealed the charter with great solemnity on June 15, 1215.

The great charter reared up a barrier against the abuse of the royal prerogative by a series of provisions for the protection of the rights and obligations of the feudal proprietor. It redressed a variety of grievances connected with feudal tenures, some of them now so long obsolete as to be with difficulty intelligible. There are minute provisions regarding the relief of heirs, wardship, marriage of heirs and of their widows. No scutage or aid is to be imposed without the authority of the common council of the kingdom, except on the three great feudal occasions of the king's captivity, the knighting of his eldest son, and the marriage of his eldest daughter. The liberties of the city of London and other towns, boroughs, and ports are declared inviolable. Freedom of commerce is guaranteed to foreign merchants. Justice is no longer to be sold, denied, or delayed. The court of common pleas, instead of, as formerly, following the king's person in all his progresses, is to be permanently fixed at Westminster; assizes are to be held in the several counties, and annual circuits are established. Regulations are made for the efficiency of the inferior courts of justice. The protection of life, liberty, and property from arbitrary spoliation is the most important feature of the charter. "No freeman shall be taken or imprisoned, or be disseized of his freehold, or liberties, or free customs, or be otherwise damaged, nor will we pass upon him, nor send upon him, but by lawful judgment of his peers, or by the law of the land"—a provision which recognized a popular tribunal as a check on the official judges, and may be looked on as the foundation of the writ of habeas corpus. No one is to be condemned on rumors or suspicions, but only on the evidence of witnesses. Protection is afforded against excessive amercements, illegal distresses, and various processes for debts and services due to the crown. The fines imposed are in all cases to be proportioned to the magnitude of the offense, and even the villein or rustic is not to be deprived of his necessary chattels. There are provisions regarding the forfeiture of lands for felony. The testamentary power of the subject is recognized over part of his personal estate, and the rest is to be divided between his widow and children. The independence of the church is also provided for.

These are the most important features of that charter which occupies so conspicuous a place in history, and which establishes the supremacy of the law of England over the will of the monarch. A charter was at the same time granted to mitigate the oppressions of the forest laws (q.v.). The terms dictated by the barons to John included the sur-

render of London to their charge, and the Tower to the custody of the primate till August 15 following, or till the execution of the several articles of the great charter. Twenty-five barons, as conservators of the public liberties, were invested with extraordinary authority, which empowered them to make war against the sovereign in case of his violation of the charter. Several solemn ratifications were required by the barons both from John and from Henry III.; and a copy of the great charter was sent to every cathedral, and ordered to be read publicly twice a year. The copy preserved in Lincoln cathedral is regarded as the most accurate and complete; and a fac-simile of it was engraved by order of the late board of commissioners on the public records. The great charter and charter of the forests are printed with English translations, and prefixed to the edition of the statutes of the realm published by the record commission.

MAGNA GRÆCIA (Gr. *Hē Megalē Hellas*), the name given in ancient times to that part of southern Italy which was thickly planted with Greek colonies. When it first obtained this appellation is unknown, but it must have been at an early period. Polybius says it was so called in the time of Pythagoras. Some writers include under the term the Greek cities in Sicily; others restrict it to those situated on the gulf of Tarentum, but in general it is used to denote all the Greek cities in the south of Italy, exclusive of those in Sicily. The oldest settlement is believed to have been Cumæ—though it is doubtful whether it and its colonies, Dicæarchia and Neapolis, were really embraced under the designation Magna Græcia; while the period assigned to its foundation—viz., soon after the Trojan war—is obviously fanciful. If we fix about the 8th or 9th c. before Christ, we will perhaps not be far wrong. Of the other Greek settlements in Italy—most, if not all of which were later than those in Sicily—the earliest was Sybaris (founded by the Achæans, 720 B.C.); next, Croton (by the Achæans, 710 B.C.); then Tarentum (by the Spartans, 708 B.C.); Locri (by the Locrians, 708 B.C., according to others, 30 or 40 years later), Rhegium (by the Chalcidians; date of origin not known, but believed by some to be older than even Sybaris), Metapontum (by the Achæans, 700–680 B.C.), and Velia (by the Phocæans, 540 B.C.). These cities became, in their turn, the parents of many others.

Of the earlier history of Magna Græcia we know almost nothing. The settlements appear to have risen rapidly to power and wealth, partly by the brisk commerce which they carried on with the mother-country, and partly also, it is conjectured, by an amalgamation with the Pelasgic (and therefore kindred) natives of the interior. This, we are told by Polybius, actually happened at Locri, and most probably elsewhere also. About the year 530 B.C. Pythagoras the philosopher arrived at Crotona, and soon acquired an influence in Magna Græcia which was quite wonderful, though it did not last long. The quarrels between the different cities were often bitter and bloody; and finally, 272–271 B.C., the Romans conquered the whole of Lower Italy.—Long before this several of the cities had disappeared. Sybaris, for example, was destroyed by the Crotonians as early as 510 B.C., and now the rest more or less rapidly sunk into decay, and were, in the time of Cicero, with a few exceptions, reduced to utter ruin.

MAGNAN, BERNARD PIERRE, 1791–1865; b. Paris; son of a notary; entered the army in 1809, and served under Napoleon till the defeat at Waterloo; lieut.col. in the campaign in Spain 1823–27; was in the expedition to Algiers in 1830. Censured for lack of energy in dealing with an insurrection in Marseilles in 1831, he entered the service of Belgium as gen. of brigade; in 1839 returned to France; was implicated in the first attempt of Louis Napoleon to make a rising of the people in his favor at Boulogne; in 1848 tendered his services to Louis Philippe after his dethronement, but was energetic in bringing the army of the Alps to Paris in June of that year to repress a formidable insurrection under the republic, and another at Lyons in 1849. He allied himself with Louis Napoleon when president of France, and was his efficient instrument in overthrowing the republic by the treacherous *coup d'état* of Dec. 2, 1852, which made Napoleon emperor. The emperor made him a grand marshal of France.

MAGNE, PIERRE, 1806–78, b. France; was employed when a young man by the prefect of Dordogne; and afterwards pursued the study of jurisprudence at Toulouse. Returning to Périgueux, his native place, he entered upon the practice of his profession. His talents did not escape the notice of the government, which made him, in 1835, a councilor to the prefecture of the Dordogne. He was elected to the chamber of deputies in 1843, and soon came to be considered an authority in its financial discussions, in which he took part as a member of the committee on the budget. He became an under-secretary in the war department in 1847, but resigned upon the outbreak of the revolution in 1848, and retired to Périgueux, whence, the following year, he was recalled to take the place of under-secretary in the ministry of finance. He was transferred to the department of public works in 1850. He withdrew from the cabinet in consequence of the dissension among its members in regard to the confiscation of the estates of the Orléans family. He was chosen senator in 1852, and in July of that year re-entered the cabinet, in his old position as minister of public works. In 1853 he was appointed minister of commerce and agriculture, and in 1855 minister of finance. His knowledge of and talent for finance were remarkable, and though he occasionally resigned or was transferred to some other department, on account of his inability to agree with his colleagues, or to carry out some favorite financial scheme, he was always sure to be recalled.

He was out of office from 1863 to 1867, when he was re-instated as the only man who could successfully place the great loan, whose negotiation France was then contemplating. When Émile Ollivier was invited by the emperor, Dec. 27, 1869, to form a new ministry, Magne went out of office; and his place was taken by M. Buffet. He returned to the treasury when the duc de Broglie took office, April 24, 1873, and went out with the de Broglie ministry, May 16, 1874. At the time de Broglie formed his cabinet, Magne was serving in the national assembly, to which he had been returned from the department of the Dordogne. His last public office was that of a senator for the Dordogne, to which office he was elected in 1876.

MAGNENTIUS, FLAVIUS POPILIUS, Roman emperor of the west. He was of barbarian extraction, but soon rose to the rank of count under the emperor Constantine the great. Entering the service of Constans, son of Constantine the great, emperor of the west, he was put in command of the troops that defended the Rhine, and plotted the overthrow of that prince. With the aid of Marcellinus, count of the sacred largesses, his plot was successful. Marcellinus having invited the officers of the army, stationed near the city of Autun, to a banquet in honor of the birthday of his son, at a late hour introduced Magnentius arrayed in robes of royalty. The cry "Long live Augustus" was raised by several conspirators, Constans was assassinated, and Magnentius took possession of the palace at Autun. In a short time Gaul, Italy, and most of the western provinces, acknowledged the usurper as emperor. Constantius, the brother of Constans, and emperor of the east, hastened to avenge the death of his brother, and totally defeated Magnentius before the town of Mursa on the Drave, 351. He fled to Italy, thence to Gaul, where Constantius followed him, and again in 353 defeated him in the Cottian Alps. On the eve of being captured by his enemies, and deserted by the countries that had acknowledged him, he committed suicide at Luddunum, Aug., A.D. 353. Constantius thus became master of the whole empire.

MAGNESIA. See MAGNESIUM.

MAGNESIA, a district of Thessaly, Greece, the narrow and mountainous portion between the river Peneus and the Pagasæan bay to the n. and s. and between the chain of Ossa and the sea on the w. and east. The Magnesians submitted to Xerxes, but afterwards were subdued by the kings of Macedon, who succeeded Alexander, and were declared free by the Romans after the battle of Cynoscephalæ. Their government was then republican.

MAGNESIA, the name of two ancient cities of Asia Minor. The first was in the northern part of Lydia, near the Hermus, at the foot of Mt. Sipylus, and was called *Magnesia near Sipylus*, to distinguish it from the other. Its founder and early history are not known, but it was first brought into notice by the victory of the Romans over Antiochus the great, in 187 B.C. It was one of the 12 cities destroyed by the earthquake in the time of Tiberius, which he soon rebuilt. It is now Manissa. The second was in Caria on the river Lethæus in the valley of the Mæander, and called *Magnesia at the Mæander*, to distinguish it from that near Mt. Sipylus. It was 15 m. from Ephesus. It had a famous temple of Diana, the remains of which Hamilton discovered in exploring the ruins of the city.

MAGNESIAN LIMESTONE. See DOLOMITE.

MAGNESIUM (symb. Mg. eq. 12—new system, 24—sp. gr. 1.74) is generally ranked with those metals whose oxides form the alkaline earths (baryta, strontia, lime), but in many respects it more closely resembles zinc. It is a malleable, ductile metal, of the color and brilliancy of silver. It fuses at about the melting-point of tin (about 442°), and at an extreme heat it may be distilled like zinc. When ignited in dry air or in oxygen gas, it burns with extraordinary brilliancy, and is oxidized into magnesia. In dry air it undergoes little change, and is much less oxidizable than the other metals of the same group. It does not decompose cold water; but if the water be heated to about 90°, there is a slight evolution of hydrogen; and if the temperature is raised to 212°, hydrogen is given off rapidly and abundantly. When thrown into strong hydrochloric acid, it inflames and becomes converted into chloride of magnesium, while hydrogen is given off.

It is obtained from its chloride either by the action of sodium or potassium, or by simple electrolytic decomposition; but the ordinary processes are difficult, and yield the metal only in minute quantities. A patent has, however, been taken out by Mr. Sonstadt for improvements in its manufacture, by which it can be produced by the pound.

Magnesia (MgO) is the only oxide of magnesium. It is a white bulky powder, devoid of taste or smell, and having a sp. gr. of 3.65; it is infusible, and almost insoluble in water; and when placed on moistened test paper, is seen to have an alkaline reaction. When mixed with water, it gradually forms a hydrate (MgO,HO), without, as in the case of lime, any sensible elevation of heat, and this hydrate slowly absorbs carbonic acid from the atmosphere. Magnesia does not occur native, and is usually obtained by the prolonged application of heat to the carbonate. Hydrate of magnesia occurs naturally in a crystalline form in the mineral brucite.

Magnesia alba, the common white magnesia of commerce, is a mixture of the hydrate of magnesia and of hydrated carbonate. It is obtained by the precipitation of a hot

solution of sulphate of magnesia by a hot solution of carbonate of potash or soda, and by then collecting and drying the deposit.

Of the *magnesian salts*, some are soluble and some insoluble in water. The soluble salts have a peculiar and very bitter taste, and hence the German name, *bittererde* (bitter-earth), for magnesia. All the salts which are insoluble in water, except the silicate, dissolve in hydrochloric and nitric acids.

Carbonate of magnesia occurs native in the mineral *magnesite*, and in association with carbonate of lime in *dolomite*, from which it may be manufactured in a very pure state by Mr. Pattinson's process, which consists essentially in the following steps: Finely ground dolomite is exposed for some time to a red heat, by which the carbonate of magnesia is decomposed; the powder is then introduced into a very strong vessel, where it is mixed with water, and carbonic acid gas forced in under heavy pressure till it ceases to be absorbed; the carbonate of magnesia becomes dissolved as bicarbonate, while the carbonate of lime remains unchanged; on boiling the clear liquid, carbonate of magnesia is deposited, and carbonic acid expelled.

Sulphate of magnesia, or *Epsom salts* (MgO,SO_3+7Aq), is the most important of the magnesian salts. It is obtained from sea-water, or from magnesian limestone (dolomite), or from the mother-liquor of alum-works, by processes into which we have not space to enter, and is a common ingredient in mineral waters (see EPSOM SALT). It is soluble in three times its weight of water at 60°, and in less water at a higher temperature, the solution having a bitter, disagreeable taste.

Nitrate of magnesia (MgO,NO_5+6Aq) occurs in certain mineral waters, but is of no special importance.

A *phosphate of magnesia*, having the formula $HO,2MgO,PO_5+14Aq$, is obtained by the mixture of solutions of sulphate of magnesia and of ordinary phosphate of soda. It occurs either in an amorphous state or in six-sided prisms, according as the solutions are more or less concentrated. This salt is a constituent of the seeds of wheat and the other cereals, of bones, and of various morbid concretions. The *phosphate of ammonia and magnesia*, known also as *ammoniaco-magnesian phosphate* and as *triple phosphate* ($NH_4O,2MgO,PO_5+12Aq$), is a more important salt than the preceding. It occurs either in minute crystalline grains or in beautiful transparent four-sided prisms of considerable size, and with a very characteristic appearance. The formation of the salt, which is only slightly soluble in pure water, and is quite insoluble in water containing free ammonia or its hydrochlorate, not only furnishes a very delicate test for the presence of magnesia, but enables us to determine its quantity.

This phosphate of ammonia and magnesia is readily formed by mixing a solution of a magnesian salt with hydrochlorate of ammonia, phosphate of soda, and a little free ammonia. It is an occasional constituent of urinary calculi, and crystallizes in beautiful prisms from urine and other animal fluids, when they begin to putrefy. It is also frequently present in the excrements in cases of diarrhea.

The *silicates of magnesia* are numerous. A large number of minerals are formed either wholly or partly of them, among which may be mentioned olivine or chrysolite, talc, steatite or soapstone, meerschaum, serpentine, augite, hornblende, etc.

The haloid salts of magnesium—the chloride, iodide, and bromide—are of no special interest, except that the chloride of magnesium is, next to chloride of sodium, the most abundant of the salts existing in sea-water.

The compounds of magnesium employed in medicine are magnesia, its carbonate, and its sulphate.

Magnesia is presented in small doses (from 10 grains to a scruple), as an antacid, in cases of undue acidity of the stomach, heart-burn, and abnormal acidity of the urine; in larger doses (from a scruple to a dram), it produces distinct purgative effects. It is useful, especially when combined with rhubarb and a little ginger (in the form of compound rhubarb powder or Gregory's mixture), as a purgative for children, in acid conditions of the alimentary canal.

Carbonate of magnesia (magnesia alba) acts in the same manner as magnesia, except that it is less active, since more than half of it consists of water and carbonic acid. Dinneford's solution of magnesia, and other fluid preparations of the same nature, are made by dissolving this salt in water charged with carbonic acid. A dram of carbonate of magnesia, the juice of one lemon, and a wine-glassful of water constitute an agreeable laxative, a citrate of magnesia being thus formed.

Sulphate of magnesia is a purgative in very general use. It is much employed in febrile affections, and when the portal system is congested; but it may be used in almost any case in which a mild but efficient laxative is required. Its dose varies from 2 to 4 or 6 drams. In combination with the infusion of senna, it forms the ordinary *black draught*. See MAGNESIUM AND THE MAGNESIUM LIGHT.

MAGNE'SIUM AND THE MAGNESIUM LIGHT. Although the discovery of the metal magnesium was made by sir H. Davy in 1808, it was looked upon as little more than a chemical curiosity for about half a century. In 1830 a French chemist, Bussy, obtained globules of the metal by fusing globules of potassium, in a glass tube, with anhydrous chloride of magnesium. Bussy's labors were followed by somewhat improved methods, adopted by Bunsen, and subsequently by Matthiessen, who succeeded in pressing some

grains of the metal into wire. The first great advance on Bussy's labors was in 1856, when Deville and Caron effected the reduction of the pure chloride of magnesium by mixing it with fused chloride of sodium in clay crucibles, using fluoride of calcium as a flux, and throwing in fragments of sodium; they thus obtained magnesium on a larger scale than any of their predecessors. The most important part of their investigations was the discovery of the volatility of the metal. All these were, however, mere laboratory experiments. In 1859 Bunsen of Heidelberg, and Roscoe (now of Manchester), published a memoir on the great importance of magnesium for photographic purposes, owing to the high refrangibility and the great actinic power of the light emitted by burning magnesium-wire. The study of this memoir led Mr. Sonstadt to consider whether, the magnesian salts being so abundant, the metal might not be obtained, on a comparatively large scale, at a moderate price. After a prolonged series of expensive experiments he succeeded, in 1862, in producing specimens of the metal varying from the size of a pin's head to that of a hen's egg. Although it burned freely enough, it was still wanting in ductility and malleability, in consequence of the presence of certain impurities; but by May, 1863, these difficulties were overcome by a process of purification by distillation; and by the close of that year he considered it safe to begin manufacturing. The magnesium metal company was consequently organized, and operations commenced at Manchester, where magnesium is now made on a considerable scale, as well as by an American magnesium company at Boston. One great advantage of Sonstadt's method is its simplicity; it can be accomplished by the hands of ordinary workmen ignorant of all chemical knowledge. The process of manufacture may be thus described: 1. An anhydrous chloride of magnesium is prepared by saturating lumps of rock-magnesia (carbonate of magnesia) with hydrochloric acid, and then evaporating the solution to dryness. 2. One part of metallic sodium cut in small pieces is placed in an iron crucible, and covered with five parts of the chloride. The crucible is covered, and heated to redness, when the chlorine leaves the magnesium and unites with the sodium, for which it has a stronger affinity. When the crucible has cooled, and its contents are removed *en masse*, and broken, the magnesium—in that state known as crude magnesium—is seen in nuggets of various sizes, varying from granules to masses as large as a hen's egg. 3. The distillation of the crude metal is effected in a crucible through which a tube ascends to within an inch of the lid. The tube opens at the bottom into an iron box, placed beneath the bars of the furnace, where, on the completion of the operation, magnesium is found in the form of a heap of drippings, which may be melted and cast into ingots or any desired form. The difficulty of obtaining a metal with so little ductility in the form of wire—the only form that was originally used for yielding light—had still to be overcome; and after various partially successful attempts to press small quantities into wire by Matthiessen and others, Mr. Mather of Salford devised a piece of machinery by which the metal is pressed into wire of various thickness. Mr. Mather also was the first who obtained the metal in ribbons, in which form, from the larger exposed surface, combustion takes place more completely. The apparatus for making the wire and ribbon is very ingenious. "The chief feature of it is a small hollow cylinder, adapted to receive a ram at one end, and covered at the other by an iron screen perforated with two or more holes opposite the chamber. This press, as the cylinder is called, is subjected to the action of gas from a blow-pipe, and the heat employed is only sufficient to soften the metal in the press. The pieces of magnesium are thrust into the chamber, the ram is placed in the mouth of the press, and a pressure of between two and three tons—obtained by hydraulic apparatus or by steam—forces the ram against the softened metal, and the latter oozes in continuous strings of wire through the perforations already named. To make ribbon, the wire thus obtained is passed between two hollow heated rollers, and is received in a flattened state upon a reel."—*Richardson & Watts's Chemical Technology.* To Mr. Mather is also due the credit of having constructed the first magnesium lamp, in which the end of the wire or ribbon is presented to the flame of a spirit-lamp. A concave reflector sent the light forward, and protected the eyes of the operator.

The first time that a photograph was taken by this light was at Manchester in the spring of 1864 by Mr. Brothers and Dr. Roscoe. That the magnesium light, in a more or less modified form, must prove of extreme value to photography cannot be called in question. Besides overcoming the obstacle of unsuitable weather for the employment of sunlight, it may be applied both for the exploration and the photography of various dim structures, underground regions, etc., such as the interior of the pyramids, of catacombs, natural caverns, etc., which could not otherwise be examined or photographed. Prof. Piazzi Smyth, the Scottish astronomer-royal, dating from the east tomb, great pyramid, Feb. 2, 1865, writes as follows: "With any number of wax candles which we have yet taken into either the king's chamber or the grand gallery, the impression left on the mind is merely seeing the candles and whatever is very close to them, so that you have small idea whether you are in a palace or a cottage; but burn a triple strand of magnesium wire, and in a moment you see the whole apartment, and appreciate the grandeur of its size and the beauty of its proportions." M. Madar is said to have taken a series of photographs of the catacombs of Paris; various artists are busy practicing on monuments in obscure recesses of continental churches; and in different parts of England caves of prehistoric interest either have been, or are about to be, photographed by this

light. For portraiture, it is found to be less successful than was at first expected, owing to the intense light within a few feet of the sitter's eyes causing a contraction of the facial muscles.

Objectors to the application of such lights for the lighting of large buildings and thoroughfares maintain that, while light derived from oil or coal-gas, in which carbon constitutes the ignitible solid, possesses a power of diffusibility which renders objects not directly opposed to the course of the rays more or less distinctly visible, the electric, lime, and magnesium lights possess less of this diffusiveness; their rays being apparently projected with a force and velocity which interfere with the power of diffusion. An object placed in the direct course of the rays is splendidly illuminated, and the rays are projected to an immense distance; but the shadows cast by intervening objects are intensely black, and the rays seem to pass through the atmosphere without producing much effect, except upon those parts on which they directly fall.

We may now state some of the advantages which arise from the use of the magnesium light. Its color approaches very much nearer to daylight than that of the light from oils, candles, or coal-gas. As compared with the sun, its luminous intensity is $\frac{1}{525}$, but its chemical intensity is $\frac{1}{36}$, and this high actinic power makes it specially valuable for photographic purposes. Although it does not nearly equal the electric light as an illuminating agent, like it the magnesium light gives off no noxious vapors. But as it burns, white clouds of the vapor of magnesia are formed which would be more or less troublesome in private rooms. This objection is said to be to some extent removed, without diminishing the brilliancy of the light, by alloying with zinc; and at any rate, it would scarcely at all interfere with its use in large public buildings. Still less would it do so when the light is burned in the open air.

There is, however, not much hope of the magnesium light successfully competing with the electric light for the illumination of large buildings, streets, or even of ocean steamers. Recent trials with the electric light at the British museum and other places have now proved conclusively that wherever a great deal of light is required, gas is beaten out of the field on the score of economy. As respects the maintenance of an equal amount of light, gas is 20 times more costly, a difference which will speedily cover the original expense of the necessary electrical apparatus. The magnesium light, on the other hand, is much more costly than gas; and although the ores which could be used as a source of magnesium are very abundant, yet any probable cheapening of the process of extracting the metal from these is not likely to make the light a very economical one. Still, for any purpose where, for a comparatively brief time, a very intense light is required, magnesium wire or ribbon has about it almost the simplicity of a wax taper; nor are the lamps at all complex by which the metal may be burned for hours continuously.

Two kinds of magnesium lamps are made. In one of these kinds, wire or thin ribbon of the metal is coiled about a reel or bobbin. From this reel the ribbon is drawn by means of two small rollers and projected through a tube to the focus of a metallic reflector, where it passes through the flame of a spirit-lamp to insure its continuous combustion. These rollers are kept in motion either by an operator turning a small wheel, or in the more expensive forms by clock-work. In the other kind of lamp the magnesium is used in the form of dust, which is mixed with fine dry sand in the proportion of one of the former to two of the latter. This mixture is placed in a funnel-shaped reservoir, and conducted, by means of a narrow tube provided with a stop-cock, to the flame of a spirit-lamp which serves to ignite and maintain the flame of the powdered magnesium. If nitrate of strontia be substituted for sand, a splendid red light is produced, and in this way, by using other chemicals, various colors can be obtained.

It was about the year 1864 that magnesium was first made on a commercial scale, and it is found that the demand for it, although not decreasing, is scarcely at all extending. It is almost wholly used for burning in photographic lamps, for flash lights, and for fire-works. It has been attempted to make magnesium useful for other purposes. Various alloys have been made with it and other metals, such as lead, tin, zinc, cadmium, and silver; but they are all brittle and liable to change. It is very doubtful, therefore, if any of these alloys will become useful in the arts, and the metal itself is scarcely likely to be available in the construction of objects of ornament or utility, since, when exposed to damp, it soon becomes coated with a film of hydrate of magnesium.

MAGNETIC CURES. It was held by physicians of old that the magnet exercised an important influence on the human body, or on the bodies of certain persons: this being shown in the alleviation of headache, toothache, cramp, etc. It has, however, been proved that the magnet as such has no influence on animal organisms, and that accordingly all cures professedly resting on such action have been due to delusion or deceit. But it is quite otherwise with magneto-electricity and galvanism. See ELECTRICITY, MEDICAL.

MAGNETIC IRON ORE. See LOADSTONE, *ante*.

MAGNETISM (said to be derived from the city Magnesia, where the loadstone was first discovered), is the power which the magnet has to attract iron. Under DIAMAGNETISM it is stated that every substance is more or less affected by the magnet, but as

iron is *par excellence* magnetic, the term is chiefly used with reference to it. Magnets are of two kinds, *natural* and *artificial*. Natural magnets consist of the ore of iron called magnetic, familiarly known as loadstone. Artificial magnets are, for the most part, straight or bent bars of tempered steel, which have been magnetized by the action of other magnets, or of the galvanic current.

Polarity of the Magnet.—The power of the magnet to attract iron is by no means equal throughout its length. If a small iron ball be suspended by a thread, and a magnet (fig. 1) be passed along in front of it from one end to the other, it is powerfully

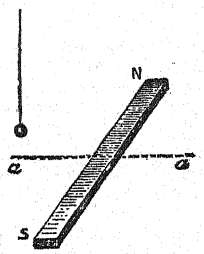


FIG. 1.

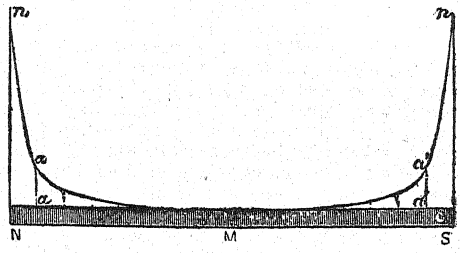


FIG. 2.

attracted at the ends, but not at all in the middle, the magnetic force increasing with the distance from the middle of the bar. The ends of the magnet where the attractive power is greatest are called its poles. By causing a magnetic needle moving horizontally to vibrate in front of the different parts of a magnet placed vertically, and counting the number of vibrations, the rate of increase of the magnetic intensity may be exactly found. Fig. 2 gives a graphic view of this increase. N S is the magnet; the lines *n* N, *a a*, etc., represent the magnetic intensities at the points N, *a*, etc., of the magnet; and the curve of magnetic intensity, N *a* M *a' n'*, is the line formed by the extremities of all the upright lines. It will be seen from the figure that the force of both halves, taking M as the dividing-point, is disposed in exactly the same way, that for some distance on either side of the middle or neutral point there is an absence of force, and that its intensity increases with great rapidity towards the ends. The centers of gravity of the areas M N *n* and M S *n'* are the poles of the magnet, which must therefore be situated near but not at the extremities.

A magnet has, then, two poles or centers of magnetic force, each having an equal power of attracting iron. This is the only property, however, which they possess in common, for when the poles of one magnet are made to act on those of another, a striking dissimilarity is brought to light. To show this, let us suspend a magnet, N S, fig. 3, by a band of paper, M, hanging from a cocoon thread (a thread without torsion). When the magnet is left to itself, it takes up a fixed position, one end keeping north, and the other south. The north pole cannot be made to stand as a south pole, and *vice versa;* for when the magnet is disturbed, both poles return to their original positions. Here, then, is a striking dissimilarity in the poles, by means of which we are enabled to distinguish them as *north pole* and *south pole*. When thus suspended, let us now try the effect of another magnet upon it, and we shall find that the pole of the suspended magnet that is attracted by one of the poles of the second magnet is repelled by the other, and *vice versa;* and where the one pole attracts, the other repels. If, now, the second magnet be hung like the first, it will be found that the pole which attracted the north pole of the first magnet is a south pole, and that the pole which repelled it is a north pole. We thus learn that *each magnet has two poles, the one a north, the other a south pole, alike in their power of attracting soft iron, but differing in their action on the poles of another magnet, like poles repelling, and unlike poles attracting, each other.*

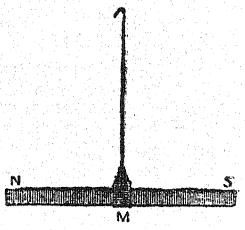


FIG. 3.

It might be thought that, by dividing a magnet at its center, the two poles could be insulated, the one half containing all the north polar magnetism, and the other the south. When this is done, however, both halves become separate magnets, with two poles in each—the original north and south poles standing in the same relation to the other two poles called into existence by the separation. *We can therefore never have one kind of magnetism without having it associated in the same magnet with the same amount of the opposite magnetism.* It is this double manifestation of force which constitutes the polarity of the magnet.

The fact of the freely suspended magnet taking up a fixed position has led to the theory that the earth itself is a huge magnet, having its north and south magnetic poles in the neighborhood of the poles of the axis of rotation, and that the magnetic needle or suspended magnet turns to them as it does to those of a neighboring magnet. All the manifestations of terrestrial magnetism give decided confirmation of this theory. It is on this view that the French call the north pole of the magnet the south pole (*pôle*

austral), and the south the north pole (*pole boréal*); for if the earth be taken as the standard, its north magnetic pole must attract the south pole of other magnets, and *vice versa*. In England and Germany the north pole of a magnet is the one which, when freely suspended, points to the north, and no reference is made to its relation to the magnetism of the earth.

Form of Magnets.—Artificial magnets are either bar magnets or horse-shoe magnets. When powerful magnets are to be made, several thin bars are placed side by side, with their poles lying in the same way. They end in a piece of iron, to which they are bound by a brass screw or frame. Three or four of these may be put up into the bundle, and these again into bundles of three and four. Such a collection of magnets is called a *magnetic magazine or battery*. A magnet of this kind is more powerful than a solid one of the same weight and size, because thin bars can be more strongly and regularly magnetized than thick ones. Fig. 4 is a horse-shoe magnet magazine. The central lamina protrudes slightly beyond the other, and it is to it that the armature is attached, the whole action of the magnet being concentrated on the projection. A good form of magnet is a parallelopiped of magnetic iron ore, with pieces of soft iron, bound to its poles by a brass frame encircling the whole. The lower ends of the soft iron bars act as the poles, and support the armature. The magnetic needle is a small magnet nicely balanced on a fine point. See COMPASS.

Magnetic Induction.—When a short bar of soft iron is suspended from one end of a magnet it becomes for the time powerfully magnetic. It assumes a north and south pole, like a regular magnet, as may be seen by using a small magnetic needle; and if its lower end be dipped into iron filings, it attracts them as a magnet would do. When it is taken away from the magnet the filings fall off, and all trace of magnetism disappears. It need not be in actual contact to show magnetic properties; when it is simply brought near, the same thing is seen, though to a less extent. If the inducing magnet be strong enough, the induced magnet, when in contact, can induce a bar like itself, placed at its extremity, to became a magnet; and this second induced magnet may transmit the magnetism to a third, and so on, the action being, however, weaker each time.

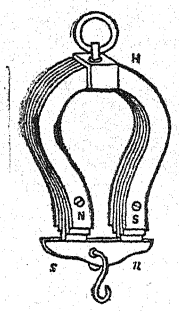


FIG. 4.

If a steel bar be used for this experiment, a singular difference is observed in its action; it is only after some time that it begins to exhibit magnetic properties, and, when exhibited, they are feebler than in the soft iron bar. When the steel bar is removed, it does not part instantly with its magnetism, as the soft iron bar, but retains it permanently. Steel, therefore, has a force which, in the first instance, resists the assumption of magnetism; and, when assumed, resists its withdrawal. This is called the *coercitive force*. The harder the temper of the steel, the more is the coercitive force developed in it. It is this force also, in the loadstone, which enables it to retain its magnetism.

Magnetization.—By single touch (Fr. *simple touche*, Ger. *einfacher strich*): The steel bar to be magnetized is laid on a table, and the pole of a powerful magnet is rubbed a few times along its length, always in the same direction. If the magnetizing pole be north, the end of the bar it first touches each time becomes also north, and the one where it is lifted south. The same thing may be done by putting, say, the north magnetizing pole first on the middle of the bar, then giving it a few passes from the middle to the end, returning always in an arch from the end to the middle. After doing the same to the other half with the south pole, the magnetization is complete. The first end rubbed becomes the south, and the other the north pole of the new magnet. *By divided touch* (Fr. *touche séparée*, Ger. *getrennter strich*): The bar to be magnetized is placed on a piece of wood with its ends abutting on the extremities of two powerful magnets. Two rubbing magnets are placed with their poles together on the middle, inclined at an angle rather less than 30° with it. They are then simultaneously moved away from each other to the ends, and brought back in an arch again to the middle. After this is repeated a few times, the bar is fully magnetized. This method communicates a very regular magnetism, and is employed for magnetic needles, or where accuracy is needed. The magnetization by *double touch* is of less practical importance, and need not here be described. It communicates a powerful but sometimes irregular magnetism, giving rise to *consecutive* poles—that is, to more poles than two in the magnet.

For horse-shoe magnets, Hoffer's method is generally followed. The inducing magnet is placed vertically on the magnet to be formed, and moved from the ends to the bend, or in the opposite way, and brought round again, in an arch, to the starting-point. A soft iron armature is placed at the poles of the induced magnet. That the operation may succeed well, it is necessary for both magnets to be of the same width. The same method may also be followed for magnetizing bars. The bars with the armatures are placed so as to form a rectangle; and the horseshoe-magnet is made to glide along both in the way just described.

Magnetization by the Earth.—The inductive action of terrestrial magnetism is a striking proof of the truth of the theory already referred to, that the earth itself is a magnet. When a steel rod is held in a position parallel to the dipping-needle (q.v.), it

becomes in the course of time permanently magnetic. This result is reached sooner when the bar is rubbed with a piece of soft iron. A bar of soft iron held in the same position is more powerfully but only temporarily affected, and when reversed, the poles are not reversed with the bar, but remain as before. If when so held it receive at its end a few sharp blows of a hammer, the magnetism is rendered permanent, and now the poles are reversed when the bar is reversed. The torsion caused by the blows of the hammer appears to communicate to the bar a coercitive force. We may understand from this how the tools in work-shops are generally magnetic. Whenever large masses of iron are stationary for any length of time they are sure to give evidence of magnetization, and it is to the inductive action of the earth's poles acting through ages that the magnetism of the loadstone is to be attributed.

Preservation and Power of Magnets.—Magnets, when freshly magnetized, are sometimes more powerful than they afterwards become. In that case they gradually fall off in strength till they reach a point at which their strength remains constant. This is called the *point of saturation.* If a magnet has not been raised to this point, it will lose nothing after magnetization. We may ascertain whether a magnet is at saturation by magnetizing it with a more powerful magnet, and seeing whether it retains more magnetism than before. The saturation point depends on the coercitive force of the magnet, and not on the power of the magnet with which it is rubbed. When a magnet is above saturation, it is soon reduced to it by repeatedly drawing away the armature from it. After reaching this point, magnets will keep the same strength for years together if not subjected to rough usage. It is favorable for the preservation of magnets that they be provided with an armature or keeper. For further information, see article ARMATURE. The power of a horse-shoe magnet is usually tested by the weight its armature can bear without breaking away from the magnet. Häcker gives the following formula for this weight: $W = a\sqrt[3]{m^2}$; W is the charge expressed in pounds; a, a constant to be ascertained for a particular quality of steel; and m is the weight in pounds of the magnet. He found, in the magnets that he constructed, a to be 12.6. According to this value, a magnet weighing 2 oz. sustains a weight of 3 lbs. 2 oz., or 25 times its own weight; whereas a magnet of 100 lbs. sustains only 271 lbs., or rather less than 3 times its own weight. Small magnets, therefore, are stronger for their size than large ones. The reason of this may be thus explained: Two magnets of the same size and power, acting separately, support twice the weight that one of them does; but if the two be joined, so as to form one magnet, they do not sustain the double, for the two magnets being in close proximity, act inductively on each other, and so lessen the conjoint power. Similarly, several magnets made up into a battery have not a force proportionate to their number. Large magnets in the same way may be considered as made up of several laminæ, interfering mutually with each other, and rendering the action of the whole very much less than the sum of the powers of each. The best method of ascertaining the strength of bar magnets is to cause a magnetic needle to oscillate at a given distance from one of their poles, the axis of the needle and the pole of the magnet being in the magnetic meridian. These oscillations observe the law of pendulum motion, so that the force tending to bring the needle to rest is proportionate to the square of the number of oscillations in a stated time.

Action of Magnets on each other.—Coulomb discovered, by the oscillation of the magnetic needle in the presence of magnets in the way just described, that *when magnets are so placed that two adjoining poles may act on each other without the interference of the opposite poles*, that is, when the magnets are large compared with the distance between their centers, *their attractive or repulsive force varies inversely as the square of the distance.* Gauss proved from this theoretically, and exhibited experimentally, that when the distance between the centers of two magnets is large compared with the size of the magnets, that is, *when the action of both poles comes into play, their action on each other varies inversely as the cube of the distance.*

Effect of Heat on Magnets.—When a magnet is heated to redness it loses permanently every trace of magnetism; iron, also, at a red heat, ceases to be attracted by the magnet. At temperatures below red heat the magnet parts with some of its power, the loss increasing with the temperature. The temperatures at which other substances affected by the magnet lose their magnetism differ from that of iron. Cobalt remains magnetic at the highest temperatures, and nickel loses this property at 662° F.

Ampere's Theory of Magnetism.—This theory forms the link between magnetism and galvanic electricity, and gives a simple explanation of the phenomena of electro-magnetism and magneto-electricity. We shall therefore preface the short discussion of these two subjects by a reference to it. Ampere considers that every particle of a magnet has closed currents circulating about it in the same direction. A section of a magnet according to this theory is shown in fig. 5. All the separate currents in the various particles may, however, be considered to be equivalent to one strong current circulating round the whole (fig. 6). We are to look upon a magnet, then, as a system, so to speak, of rings or rectangles, placed side by side, so as to form a cylinder or prism, in each of which a current in the same direction is circulating. Before magnetization the currents run in different directions, so that their effect as a system is lost, and the effect of induction is to bring them to run in the same direction. The perfection of magnetization is to render the various currents parallel to each other. Soft iron, in consequence

of its offering no resistance to such a disposition, becomes more powerfully magnetic under induction than steel, where such resistance exists. Experiment very strongly confirms the truth of this theory. Helices of copper wire, in which a current is made to circulate, manifest all the properties of a magnet. Such are shown, in skeleton, in figs. 7 and 8. Each convolution of the spiral may be taken as a substitute for one of the rings above spoken of. In helix fig. 7, the current, after entering, goes from right to left (contrary to the hands of a watch), and it is hence called left-handed; in fig. 8 it goes with the hands of a watch, and is right-handed. The extremities of both helices act on the magnetic needle like the poles of a magnet while the current passes. The poles are shown by the letters N and S, and this can be easily deduced from Ampere's rule (see GALVANISM), for, suppose the little figure of a man to be placed in any part of

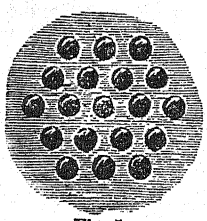


Fig. 5.



Fig. 6.

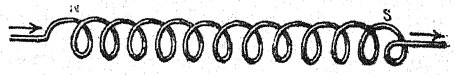


Fig. 7.

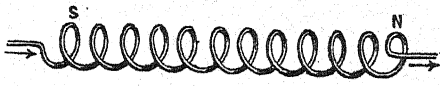


Fig. 8.

the helix fig. 7, so that, while he looks towards the axis of the helix, the current enters by his feet, and leaves by his head, the north pole will be at his left hand, as shown in the figure. In the left-handed helix (fig. 8), the poles are reversed according to the same rule. If either of these helices be hung so as to be capable of horizontal motion, which, by a simple construction, can easily be done, as soon as the current is established, the north and south poles place themselves exactly as those of the magnetic needle would do; or, if they were hung so as to be able to move vertically in the magnetic meridian, they would take up the position of the dipping-needle (q.v.).

These movements can be still further explained by reference to the mutual action of electric currents on each other. It is found that *when two currents are free to move, they endeavor to place themselves parallel to each other, and to move in the same direction,* and *that currents running in the same direction attract, and those running in opposite directions repel.* The apparatus fig. 9 is intended to prove this. The rectangle *c d e f* is movable round the pins *a* and *b*, resting on two mercury cups. The arrangement is such that while the rectangle *c d e f* is movable about its axis, a current can continue steadily to flow in it. Further description is unnecessary, the diagram explaining itself. If a wire in which a current passes downwards be placed vertically near *c d*, *c d* is attracted by it; but if the current pass upwards, it is repelled, and *e f* attracted. Place, now, the wire below and parallel to *d e*. If the current passes in the direction *d* to *e*, no change takes place, as the attraction cannot show itself; but if the current moves from *e* to *d*, the whole turns round till it stands where *e* was, and both currents run the same way. If the wire be placed at right angles to *d e*, the rectangle turns round and comes to rest, when both currents are parallel, and in the same direction.

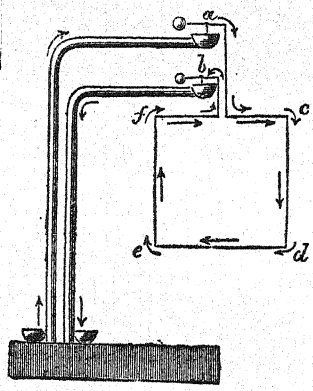


Fig. 9.

According to Ampere's theory, the earth, being a magnet, has currents circulating about it, which, according to his rule, must be from east to west, the north pole of the earth being, in our way of speaking, a south pole. A magnet, then, will not come to rest till the currents moving below it place themselves parallel to and in the direction of the earth's currents. This is shown in fig. 10, where a section of a magnet is represented in its position of rest with reference to the earth-current. The upper current being further away from the earth-current, is less affected by it, and it is the lower current that determines the position. A magnetic needle, therefore, turns towards the north to allow the currents moving below it to place themselves parallel to the earth's current. This also is shown by the rectangle in fig. 9, which comes to rest when *d* and *e* lie east and west.

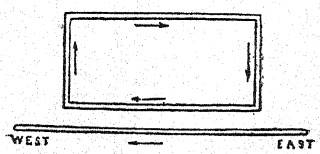


Fig. 10.

Electro-magnetism includes all phenomena in which an electric current produces magnetism. The most important result of this power of the current is the electro-magnet. This consists (fig. 11) generally of a round bar of soft iron bent into the horse-shoe form, with an insulated wire coiled round its extremities. When a current passes

through the coil, the soft iron bar becomes instantly magnetic, and attracts the armature with a sharp click. When the current is stopped, this power disappears as suddenly as it came. Electro-magnets far outrival permanent magnets in strength. Small electro-magnets have been made by Joule which support 3,500 times their own weight, a feat immeasurably superior to anything performed by steel magnets. When the current is of moderate strength, and the iron core more than a third of an inch in diameter, *the magnetism induced is in proportion to the strength of the current and of the number of turns in the coil.* When the bar is thinner than one-third of an inch, a maximum is soon reached beyond which additional turns of the wire give no additional magnetism; and even when the core is thick, these turns must not be heaped on each other, so as to place them beyond influencing the core. It follows from the above principle, that, in the horse-shoe magnet, where the inductive action in the armature must be taken into account, *the weight which the magnet sustains is in proportion to the squares of the strengths of the currents, and to the squares of the number of turns of the wire.* This maximum is in different magnets proportional to the area of section, or to the square of the diameter of the core. The electro-magnet, from the ease with which it is made to assume or lay aside its mag

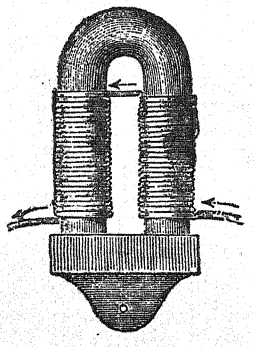


Fig. 11.

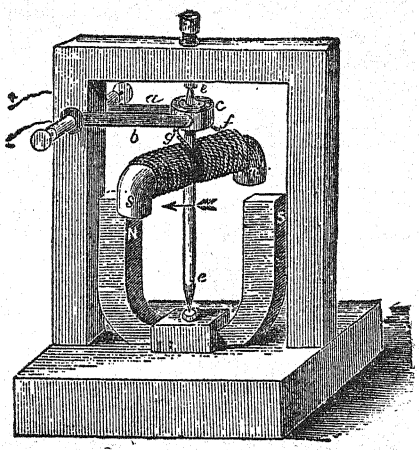


Fig. 12.

netism, or to reverse its poles, is of the utmost value in electrical and mechanical contrivances. The action of the electro-magnet is quite in keeping with Ampere's theory, as the current of the coil, acting on the various currents of the individual molecules, places them parallel to itself, in which condition the soft iron bar acts powerfully as a magnet. The direction of the current and the nature of the coil being known, the poles are easily determined by Ampere's rule.

Electro-magnetic Machines.—These take advantage of the facility with which the poles of an electro-magnet may be reversed, by which attractions and repulsions may be so arranged with another magnet as to produce a constant rotation. The forms in which they occur are exceedingly various, but the description of the apparatus in fig. 12 will suffice to illustrate their principle of working. N S is a fixed permanent magnet (it could be equally well an electro-magnet); the electro-magnet, *n s*, is fixed to the axis *e e*, and the ends of the coil are soldered to the ring *c*, encircling a projection on the axis. The ring has two slits in it dividing it into two halves, and filled with a non-conducting material, so that the halves are insulated from each other. Pressing on this broken ring, on opposite sides, are two springs, *a* and *b*, which proceed from the two binding-screws into which the wires, + and −, from the battery are fixed. In the position shown in the figure, the current is supposed to pass along *a*, to the half of the ring in connection with the end *f*, of the coil, to go through the coil, to pass by *g* to the other half of the ring, and to pass along *b*, in its return to the battery. The magnetism induced by the current in the electro-magnet, makes *s* a south, and *n* a north pole, by virtue of which N attracts *s*, and S attracts *n*. By this double attraction, *n s* is brought into a line with N S, where it would remain, did not just then the springs pass to the other halves of the ring, and reverse the current, making *s* a north, and *n* a south pole. Repulsion between the like poles instantly ensues, and *ns* is driven onwards through a quarter-revolution, and then attraction as before between unlike poles takes it through another quarter, to place it once more axially. A perpetual rotation is in this way kept up. The manner in which a constant rotary motion may be obtained by electro-magnetism being understood, it is easy to conceive how it may be adapted to the discharge of regular work. Powerful machines of this kind have been made with a view to supplant the steam-engine; but such attempts, both in respect of economy and constancy, have proved utter failures.

Magneto-electricity includes all phenomena where magnetism gives rise to electricity. Under Induction of Electric Currents (q.v.), it is stated that when a coil in which a

current circulates is quickly placed within another coil unconnected with it, a contrary induced current in the outer coil marks its entrance, and when it is withdrawn, a direct induced current attends its withdrawal. While the primary coil remains stationary in the secondary coil, though the current continues to flow steadily in the primary, no current is induced in the secondary coil. It is also shown that if, while the primary coil is stationary, the strength of its current be increased or diminished, each increase and diminution induces opposite currents in the secondary coil. Change, in fact, whether in the position or current strength of the primary coil, induces currents in the secondary coil, and the intensity of the induced current is in proportion to the amount and suddenness of the change. In singular confirmation of Ampere's theory, a permanent bar magnet may be substituted for the primary coil in these experiments, and the same results obtained with greater intensity. When a bar magnet is introduced into the secondary coil, a current is indicated, and when it is withdrawn, a current in a contrary direction is observed, and these currents take place in the directions required by Ampere's theory. A change of position of the magnet is marked by a current, as in the former case. If we had the means of increasing or lessening the magnetism of the bar, currents would be induced the same as those obtained by strengthening or weakening the current in the primary coil. It is this inductive power of iron at the moment that a change takes place in its magnetism, that forms the basis of magneto-electric machines. The manner in which this is taken advantage of will be easily understood by reference

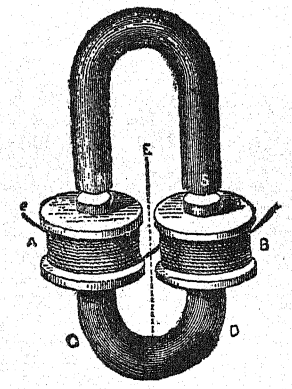


Fig. 13.

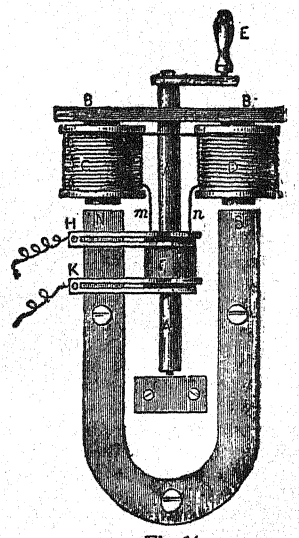


Fig. 14.

to fig. 3. N S is a permanent horse-shoe magnet, and let us suppose it to be fixed; C D is a bar of soft iron, with coils A and B wound round its extremities, and may be looked upon as the armature of the magnet. C D is capable of rotation round the axis E F. So long as C D remains in the position indicated in the figure, no currents are induced in the surrounding coils, for no change takes place in the magnetism induced in it by the action of N S. The moment that the poles of C D leave N S, the magnetism of the soft iron diminishes as its distance from N S increases; and when it stands at right angles to its former position, the magnetism has disappeared. During the first quarter-revolution, therefore, the magnetism of the soft iron diminishes, and this is attended in the coil (for both coils act, in fact, as one) by an electric current, which becomes manifest when the ends *e*, *e*, of the coil are joined by a conductor. During the second quarter-revolution, the magnetism of the armature increases till it reaches a maximum, when its poles are in a line with those of N S. A current also marks this increase, and proceeds in the same direction as before; for though the magnetism increases instead of diminishes, which of itself would reverse the induced current, the poles of the revolving armature, in consequence of their change of position with the poles of the permanent magnet, have also been reversed, and this double reversal leaves the current to move as before. For the second half-revolution the current also proceeds in one direction, but in the opposite way, corresponding to the reversed position of the armature. Thus, *in one revolution of a soft iron armature in front of the poles of a permanent magnet, two currents are induced in the coils encircling it, in opposite directions, each lasting half a revolution, starting from the line joining the poles.*

Magneto-electric Machine.—The general construction of a simple magneto-electric machine is shown in fig. 14. N S is a fixed permanent magnet. B B is a soft iron plate, to which are attached two cylinders of soft iron, round which the coils C and D are

wound. C B B D is thus the revolving armature, corresponding to C D in fig. 13. A A is a brass rod rigidly connected with the armature, and also serving as the rotating axle. F is a cylindrical projection on A A, and is pressed upon by two fork-like springs, H and K, which are also the poles of the machine. The ends, *m*, *n*, of the coils are soldered to two metal rings on F, insulated from each other. When the armature revolves, A A and F move with it. F, H, and K are so constructed as to act as a commutator, reversing the current at each semi-revolution. By this arrangement, the opposite currents proceeding from the coil at each semi-revolution are transmitted to H and K in the same direction, so that these, which constitute the poles of the battery, so to speak, remain always of the same name. When the armature is made to revolve with sufficient rapidity, a very energetic and steady current is generated. Of late years immense progress has been made in the construction of such machines. In 1866 Wilde of Manchester surprised the scientific world by a machine of unprecedented power; and more recently, Gramme of Paris has constructed another still more astonishing. These are driven by steam-engines, and completely eclipse both in power and constancy the largest galvanic battery hitherto put together. See MAGNETO-ELECTRIC MACHINE. See also ARMATURE, DECLINATION NEEDLE, DIAMAGNETISM, DIPPING NEEDLE, and ROTATION, MAGNETISM OF.

MAGNETISM, ANIMAL. See ANIMAL MAGNETISM, *ante*.

MAGNET'O-ELECTRIC MACHINE (More recent forms of). Of late years, quite a new era has arisen in the construction of magneto-electric machines. The compactness, simplicity of construction, and marvelous power which the new machines possess, give them quite a novel importance in practical electricity. The names chiefly associated with the new improvements are Wilde of Manchester, Siemens and Wheatstone, and Gramme of Paris. Mr. H. Wilde, in 1866, patented a magneto-electric machine, founded on the principle that *a current or a magnet indefinitely weak can be made to induce a current or a magnet of indefinite strength*. A general description will show how this is proved and applied.

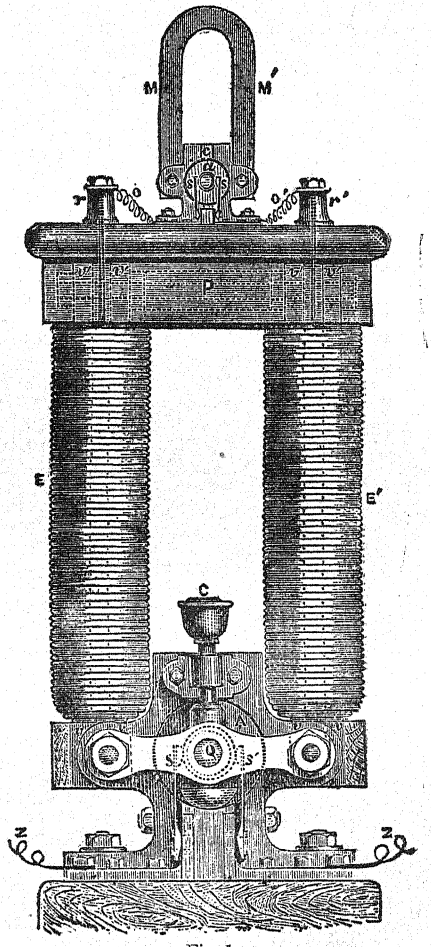


Fig. 1.

Wilde's original machine is shown in front elevation, fig. 1. It consists of two machines very similar to each other, the upper one M M', and the lower E E'. The upper and smaller machine consists of 16 permanent magnets, placed one behind the other. The front one only is seen. The poles of these are fixed at *g*, *g* (fig. 2), to what is termed the magnet cylinder. This consists of a hollow tube, made up of heavy masses of cast-iron, *c*, *c*, at each side, separated from each other by brass rods, *b*, *b*, the whole being knit firmly together, above and below, by brass bolts at *r*, *r'*. The cast-iron side pieces thus form the poles of the magnetic battery. The armature, which revolves within the tube of the magnet cylinder, is a long piece of soft iron, *a a*, and in section resembles an "H." In the hollows of the "H" the wire is turned longitudinally. This armature is shown separately in fig. 3, part of the wooden tops which cover in the wire being removed to show how the wire is turned. This form of armature was first constructed by Siemens. The ends of the armature wire are soldered to two insulated iron rings, *n*, *n'* (fig. 3), against which the springs, *s*,*s* (fig. 1), press, which convey the current from the revolving armature; *m* is the pulley of the driving-belt. If the cross-bar of the "H" stand upright (it lies horizontally in the figure), and the armature be turned round, while wires leading from the binding-screws, *r*, *r'* (fig.1), are connected with a galvanometer, it will be found that the current induced by the motion is in the same direction till the cross is again upright, but inverted. If the motion be continued beyond that point, a current in the opposite direction will ensue, lasting till the cross-bar is in its first position. The right half of

the armature gives off always one kind of electricity, and the left the other. The right and left springs, *s*, *s*, are thus always like poles, for they change from *n* to *n'* (fig. 3) when the current in the armature changes. We come now to describe the singular peculiarity and merit of Wilde's machine. The current got from the magneto-electric machine is not directly made use of, but is employed to generate an electro-magnet some hundreds of times more powerful than the magnetic battery originally employed, by means of which a corresponding increase of electricity may be obtained. This electro-magnet, E E' (fig. 1), forms the lower part of the figure, and by far the most bulky portion of the entire machine. It is of the horse-shoe form, E and E' forming the two limbs of it. The core of each of these, shown by the dotted lines, is formed by a plate of rolled iron, 36 in. in height, 26 in. in length, and 1 in. in thickness. Each is surrounded by a coil of insulated copper wire (No. 10), 1650 ft. long, wound round lengthwise in 7 layers. The current has thus, in passing from the insulated binding-screw *r* to the similar screw *r'*, to make a circuit of 3,300 feet. Each limb of the electro-magnet is thus a flat reel of covered wire wrapped round a sheet of iron, the rounded ends alone of which are seen in the figure. The upright iron plates are joined above by a bridge, P, built up also of iron-plate, and are fixed below the whole way along with the iron bars *v*, *v* to the sides of a magnet-cylinder of precisely the same construction as the one already described. The iron frame-work of the electro-magnet is shown by the dotted lines. The depth of the bridge is the same as the breadth of the bars *v'*, *v'*, which are of the same size as the bars *v*, *v*. The various surfaces of juncture in the frame-work are planed, so as to insure perfect metallic contact. The upper and lower machine are in action precisely alike, only the upper magnet is a permanent magnet, and the lower one an electro-magnet. We have the same magnet-cylinder, I, I, the same armature, A, and springs, S, S', and the same poles, Z, Z'; the size is, however, different; the caliber of the magnet-cylinder is 7 inches. The diameter of the lower armature gives the name to the machine—viz., a 7-inch machine. Figs. 2 and 3 are on the scale of the lower machine (fig. 1). The length of wire on the lower armature is 350 feet. It is 35 in. in length, and is made to rotate 1800 times a minute. The cross frame-work attached at *g g* to the magnet-cylinder, in which the front journal, *f*, of the armature rotates (at Q), is shown in the lower machine (fig. 1). When the machine is in action, both armatures are driven simultaneously by belts from the same countershaft. For the electric light, the currents conveyed to the springs, S and S', need not be sent in the same direction. In that case, the separation between *n* and *n'* is vertical; and each spring presses against only one ring during the whole revolution, receiving and transmitting each revolution two opposite currents. Oil for the journal and commutator is supplied from the cup C.

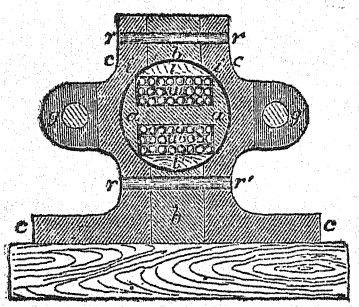


Fig. 2.

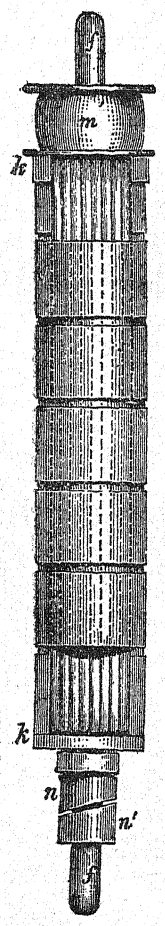


Fig. 3.

A Wilde's machine 1½ ton in weight, measuring about 5 ft. in length and height, and 20 in. wide, driven by a steam-engine produces a most brilliant electric light, and exhibits the most astonishing heating powers.

Wheatstone and Siemens gave a new interpretation to Wilde's principle. Their important discovery is of the following nature: Suppose the upper machine in fig. 1 removed, and that we have nothing but the electro-magnet and armature left. If the wires proceeding from the binding-screws of the armature be joined up with the electro-magnet, we might fancy that, there being no permanent magnetism, no result would follow on the armature being moved. Such, however, is not the case. If the armature be moved at any velocity, it will soon be brought to a halt by the mutual action ensuing. In the electro-magnet there is always some magnetism left. This induces a feeble current in the coil, but this is sufficient to make the magnet stronger and able to induce a stronger current, and this reciprocal action continues until it grows to an enormous intensity. So great, indeed, would it become, that if we had sufficient mechanical energy at our disposal to persist in the motion, the coils of armature and electro-magnet would be melted, and the machine destroyed. This startling discovery may, however, be thought of little value, as a machine that consumes its own electricity is of no external use. All machines now

work on this reciprocal principle, and a description of them will best show how it is turned to account. Ladd was the first to construct a machine on Wheatstone and Siemens's principle. In the armature there are two unequal coils, the larger for furnishing the external current, the smaller for exciting the electro-magnet. These two coils revolve together, the one at right angles to the other, in the same magnet-cylinder. In large machines he uses two magnet-cylinders, one at each end of the electro-magnet; or rather, he uses two electro-magnets, and the two armatures complete the magnetic circuit. Ferguson of Edinburgh alters Ladd's arrangement in using only one piece of iron for the armature of the machine with two grooves cut in it, a larger one for the coil giving the external current, and a smaller one for the exciting current. This offers the advantage that the heating of the solid iron of the armature by repeated magnetism is lessened by being transformed into an electric current. The electro-magnet is thus fed by a current obtained not by an additional expenditure of energy, but by the utilization of force that would be otherwise converted into useless or even hurtful heat.

The great drawback of all the forms of the machine just described is the enormous velocity at which they rotate—some 2,000 or more revolutions in the minute. At this speed a machine soon wears itself out. Another disadvantage is the heating of the armatures in Wilde and Ladd's machine. Ferguson's has never been tried on a large scale. It is found necessary to keep the armatures cool by a flow of cold water. This heat, however removed, is manifestly a mere squandering of the energy of motion, and a loss to the current given off. A third objection is the loss that always takes place when the side-springs change from the one ring to the other, sparks more or less bright accompanying the change. For the electric light, however, the alternate currents are used, and this source of loss is not experienced. These defects are removed in the latest form of the electro-magnetic machine by Gramme of Paris. In it, instead of a solid armature of iron, a ring is employed on which a great number of bobbins of wire are set. Fig. 4 is intended to explain the rudimentary principle of it. The ends of the wires of two contiguous bobbins are soldered to strips of metal called sectors. These are shown as radii in the figure. In the machine itself they are first brought down radially, then turned at right angles so as to be parallel to the axis of the machine. They are very numerous (though few in the figure), and being separated from each other by sheets of silk, form a compact whole. Metallic brushes, B, B, rub on the end face of the sectors, and form the poles of the revolving armature. The principle of action may be thus understood: Suppose we first ascertain what takes place in the coil of one bobbin as it revolves in the presence of the magnetic poles, P, N. If we start from the equatorial line, E E', and go by successive impulses, we find that, when the bobbin is joined with a galvanometer, the current induced is always in one direction until we come again to the equatorial line; but when we pass this, the current is reversed on the other side. This is much the same as what is found in the Siemens armature. But there is this difference here: The armature wire with the sectors is continuous from end to end. On each side of the equatorial line we have two equal and opposite electric forces or batteries, and these, if left alone, would neutralize each other. But if, in the equatorial line, we introduce brushes to act as poles, we have, as it were, two galvanic batteries joined up, as it is called, in quantity, with both positive poles together and also both negative. The brushes embrace several sectors at once, so there is no spark when they leave any particular sector, contact being established with the others. The conditions of the machine never alter, and hence the current is perfectly steady, and the sectors being always of the same sign at the points where the brushes rub, the current is always in the same direction. Siemens and Wheatstone's principle is employed in Gramme machines. There are two fixed electro-magnets, and two armatures on the same spindle; one electro-magnet and one armature being set apart for exciting both electro-magnets, and the other armature and electro-magnet for sending out the external current. Astonishing as were the effects produced by Wilde's machine, those obtained from Gramme's seem quite to eclipse them. In comparing two magneto electric machines, we must take into account the kind of wire used for the revolving armature. For tension purposes, a thin and long wire gives the best results; for quantity or heating purposes, a short and thick wire does best. To compare a tension with a quantity armature, the same test even in the same machine would give most contradictory results. But comparing, so far as possible, machines intended for the same purpose, Gramme seems to have the advantage of all others. In the first place, the

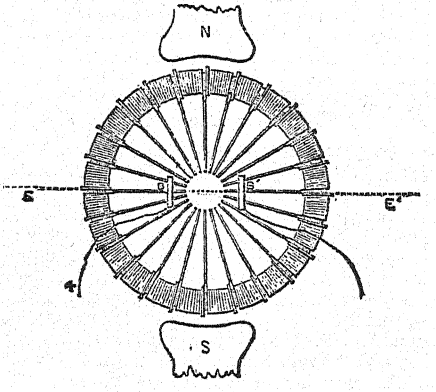


Fig. 4.

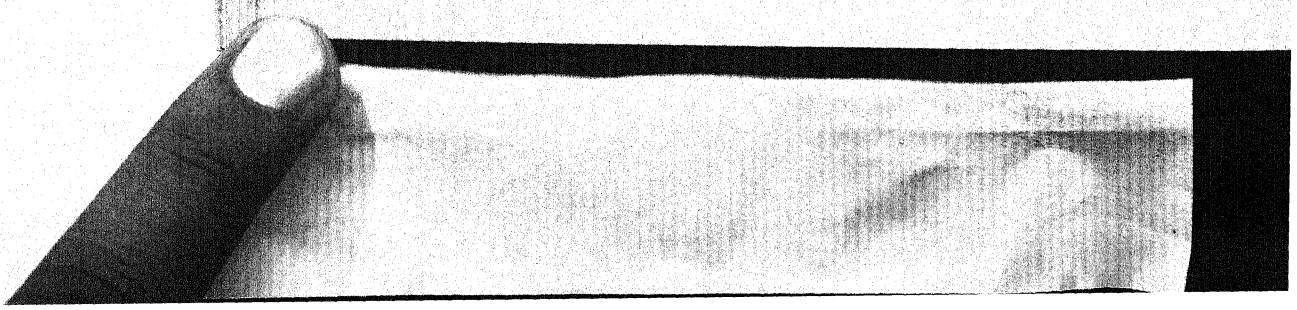
speed of revolution seldom exceeds 800 revolutions per minute; 300 is sufficient for most purposes. A Gramme machine driven by the hand will melt 10 in. of an iron wire $\frac{1}{25}$ of an inch in diameter, a feat not accomplished by any other arrangement. The electric light got by a 3-horse-power engine working a machine a ton in weight is equal to upwards of 8,000 sperm candles. A signal-light of this kind has been constructed for the house of lords, under the superintendence of the eminent engineer Conrad W. Cooke, who has rendered no small service in perfecting the machine. The carbons consumed last for four hours, and when burned out are instantaneously replaced. A Gramme machine adapted for electro-plating, and worked by a 1-horse-power engine, deposits nearly 27 oz. of silver per hour, an achievement far transcending the similar performance of other machines. Among the heating wonders of the Gramme machine we are told of a file half an inch in diameter being burnt up in 5 minutes, of 15 ft. of No. 18 platinum wire being brought to a glowing heat, and of 8 ft. of iron wire .051 inch in diameter being fused.

MAGNIFICAT, a musical composition in the evening service of the Roman Catholic church, and also of the Lutheran and English churches. The words are taken from Luke i. 46–55, containing the "song of the Virgin Mary," which, in the Vulgate, begins with *Magnificat*. In the Roman Catholic church, the Magnificat is a grand hymn, powerful in melody and harmony, mixed with pompous fugues, and with full instrumentation. In modern time there have been few attempts in the Roman Catholic service to supersede the older music of the Magnificat (by Palestrina); but in the service of the church of England, where the music is of a less elevated character, new compositions are frequently written for the Magnificat, by composers strictly of the English school.

MAGNIFYING-GLASS. See MICROSCOPE, *ante*.

MAGNIN, CHARLES, 1793–1862; b. Paris; received a superior education, and at the age of 20 became an assistant in the imperial library, and in 1832 a director. He wrote for the Paris press, theatrical criticism, essays, and sketches, and attracted the favorable notice of leading French writers. He also delivered lectures at the Sorbonne on the origin of the modern stage, and gained a sufficient reputation as a man of learning to obtain a seat in the academy of inscriptions and belles-lettres. His published works include *Causeries et Méditations Historiques et Littéraires; Les Origines du Théâtre Moderne; Le Théâtre des Hrosvitha;* and *Histoire des Marionettes*.

MAGNOLIA, a genus of beautiful trees of the natural order *magnoliaceæ*, having a calyx of 3 sepals, a corolla of 6 to 12 petals, and carpels in spikes arranged in cones, and opening at the dorsal suture. They are natives chiefly of North America, the Himalaya mountains, China, and Japan. The flowers are large and solitary; the leaves large. The wood is in general soft, spongy, and of little value. *M. grandiflora*, sometimes called the BIG LAUREL, has white flowers sometimes a foot in diameter. It is a lofty and magnificent evergreen tree, conspicuous at a great distance, found in the lower districts from North Carolina to the gulf of Mexico. It succeeds well as an ornamental tree in the s. of England, but in Scotland requires a wall and some protection in winter. *M. tripetala* is found on the Alleghany mountains, and extends as far n. as lat. 43°. From the radiated manner in which its leaves are disposed at the extremities of the branches, it has received the name of UMBRELLA TREE. It has very large white flowers. It is one of the species most commonly cultivated in Britain, but in Scotland it requires a wall. *M. acuminata* inhabits the same districts, and is a lofty tree with greenish-yellow flowers. It endures the climate of Britain well, but its flowers are not so much admired as those of some of its congeners. *M. glauca*, a native of Pennsylvania, Virginia, and Carolina, is known by the names of WHITE BAY, BEAVERWOOD, and SWAMP SASSAFRAS. It is a tree or shrub of 15 to 20 ft. in height, with very beautiful and fragrant white flowers. The YULAN, or Chinese magnolia (*M. yulan* or *conspicua*), has been much cultivated in China for more than 1200 years, on account of its beautiful and fragrant white flowers, which it produces in great profusion. It is one of the finest ornamental trees we possess, and succeeds well in the s. of England, and against a wall in Scotland. It is a deciduous tree, and the flowers expand before the development of the leaves. *M. excelsa*, one of the finest species known, is a predominant tree in some parts of the Himalaya mountains, at an elevation of 7,000 or 8,000 ft., the mountains when it is in blossom appearing as sprinkled with snow. *M. Campbellii*, another native of the same region, produces great rose-colored flowers, and is described by Dr. Hooker as the most superb of the genus. Allied to the genus *magnolia* is *Michelia*, some of the species of which are amongst the most valuable timber trees of Nepaul, and very ornamental. The bark of some of them is used medicinally, and the fragrant flowers of a species called champac are the delight of the people of Hindustan. *Manglietia* is another closely allied genus, to which belong valuable timber trees of Nepaul and of the Indian islands. The natural order *magnoliaceæ* is closely allied to *ranunculaceæ*, differing chiefly in the arborescent habit, and in the large stipules which envelop the young leaves before they open, but soon fall off. The leaves are simple. Aromatic properties are prevalent. To this order belong the *tulip tree*, *star anise*, and *winter's bark*.



MAGNUS, HEINRICH GUSTAV, 1802–70; b. Berlin; educated at the university of Berlin, where he devoted himself to the study of natural science. He also studied chemistry with Berzelius at Stockholm. At the age of 26 he had already made important discoveries in chemistry, and in 1834 was made extraordinary, and in 1845, ordinary professor of physics and technology in the Berlin university. He made important experiments on the transmission of heat through gases, which were published in 1860.

MAGNUSSEN, FINN, a distinguished scholar and archæologist, was b. in 1781 at Skabholt, in Iceland, where his family, both on his mother's and father's side, had for many generations been distinguished for learning and integrity. In 1797 Magnussen entered the university of Copenhagen with a view of studying for the law; and although he so far fullfilled the original intention of his education as to practice this profession for some years in Iceland, his strong bent towards archæological pursuits led him, in 1812, to return to Copenhagen, where he devoted himself with much zeal to his favorite studies, under the direction of his distinguished countrymen, Thorkelin and Thorlacius. In 1815 he obtained a chair of literature in the university; and in 1819, at the solicitation of the academy of fine arts, he gave a course of lectures on ancient northern literature and mythology. From this, or even an earlier period, to the close of his life, Magnussen devoted himself to the elucidation of these subjects with a success that was generally commensurate with the great ability and acute learning which he brought to bear upon it, although in some few instances his zeal led him to adopt too hasty conclusions. Among his earliest and most noteworthy works are his papers on the aboriginal home and earliest migrations of the Caucasian races (1818); his contributions to northern archæology (1820); the indices, glossaries, and lexicon which he compiled for the elucidation of the 2d and 3d of the Arne-Magnussen editions of the Eddas (1818 and 1828); his comprehensive translation of the Elder Edda (*Aldre Edda, oversat og forklaret*, Kopen. 1824); and his exposition of the same work (*Edda læren og dens Opfindelse*, Kop. 1824). Among his later works, his *Runamo og Runerne* (Kop. 1841) has given rise to much angry discussion; and although many of his interpretations of assumed runes have been proved to be utterly untenable, the learning and acumen which he brought to bear on the subject of runes generally, have thrown great light on this branch of archæology, both in regard to North American and ancient northern remains. In conjunction with Rafn, Magnussen elucidated the history and antiquities of Greenland in an able work (*Grönland's Historiske Mindesmerker*, Kop. 1838–42); and he subsequently prosecuted a similar course of inquiry in regard to Russia in *Antiquités Russes* (Cop. 1850–52). In addition to these works, Magnussen annotated nearly all the most important remains of old northern literature, as the *Heimskringla*, *Hakonarmal*, *Laxdæla-Saga*, etc.; and besides numerous monographs on arcnæological and historic subjects of interest, made many valuable contributions te current Icelandic literature. During his latter years, Magnussen sat in the Danish landthing as deputy for Iceland and the Faroe isles, in which capacity he gave evidence of considerable political knowledge and patriotic zeal. At his death, in 1847, he held the office of *Geheimarchivar* in the royal chamber of archives.

MAGO, a common Carthaginian name; no less than 14 different persons bearing it occur in history; of whom the most distinguished is Mago, the son of Hamilcar Barca, and a younger brother of Hannibal (q.v.) and Hasdrubal.

MAGOFFIN, an e. co. of Kentucky, drained by the Licking river, and bounded on the e. by mountain ranges. The surface varies in character, being fertile in parts; 600 sq.m.; pop. '80, 6,943. The productions are not abundant; wheat, Indian corn, wool, potatoes, oats, and butter, are the most important. Co. seat, Salyersville.

MAGOON', ELISHA L., D.D., b. N. H 1810; at first a bricklayer, but in 1840 ordained to the ministry of a Baptist church, and settled at Richmond, Va. After a tour in Europe, and pastorates at New York and Albany, he removed in 1860 to Philadelphia, where he remains. He has published *Orators of the American Revolution*, 1848; *Living Orators of America*, 1849; *Republican Christianity*, 1849; and *Westward Empire*, 1856. He has shown broad literary taste and culture.

MAGPIE, or PIE (*Pica*), a genus of birds of the family *Corvidæ* (q.v.), differing from the true crows chiefly in the long and graduated tail. They are also of smaller size and brighter colors, the most prevalent color being blue with bars of black and white. The only British species is the COMMON MAGPIE (*P. caudata*), the *Kitta* of the Greeks, and *Pica* of the Romans; a common bird in Britain, and almost all parts of Europe, and too well known to require particular description; its bright but not finely mingled colors—black, white, and blue—making it always conspicuous, and its dissonant, harsh cry equally attracting attention. The magpie is generally to be seen in pairs throughout the year. It builds its nest in high trees; the outside being formed of thorny sticks strongly interwoven, the inside plastered with earth and lined with fibers and dry grass; the top a dome, and one aperture left on the side for the parent bird. The magpie is shy and vigilant in an extreme degree, notable for cunning, both in eluding enemies, and in seeking its own food, as to which it may be said that nothing comes amiss to it, grain being not unacceptable, but eggs or carrion preferable. In Britain, it is persecuted by gamekeepers; in Norway, it is encouraged in the neighborhood of human habitations, and

consequently often makes its nest under the eaves of churches and other buildings. The magpie is easily tamed, becomes impudently familiar, and learns to articulate a few words. Both in a wild and tame state, it has a propensity to seize and carry off bright or glittering articles. It abounds in most parts of Europe and the north of Asia, and in the northern parts of America, but is rare in the parts of America near the Atlantic.—The other species are mostly natives of the eastern parts of Asia.

MAGRUDER, JOHN BANKHEAD, 1810–71; b. Va.; graduated at the military academy in 1830, and was appointed second lieut. in the infantry. He was promoted first lieut. in 1836, and capt. in 1846. He served with distinction through the Mexican war, at the head of the light battery attached to the division of gen. Pillow. He was brevetted maj. after Cerro Gordo, and lieut.col. after Chapultepec, where he was wounded. He resigned from the army April 2, 1861, to enter the confederate service, in which he was made successively col., brig.gen., and maj.gen. He was at first attached to the army of Virginia, commanding at Yorktown till its evacuation in May, 1862, when he joined the campaign on the Chickahominy. In October of the same year he went to Texas to take command of the department of the west, embracing, besides Texas, Arizona and New Mexico. He remained in active service in Texas throughout the war, conducting a number of military operations, of which the most brilliant resulted in the abandonment of Galveston by the federal forces. After the war he lived for a time in Mexico, but afterwards settled in Texas.

MAGUIRE, JOHN FRANCIS, 1815–72, b. Ireland; a lawyer and journalist. He sat in parliament as member for Dungarvon from 1852 to 1865, and for Cork from 1865 till his death. He was mayor of Cork for several years, and owned and edited there the *Cork Examiner*. He was the author of *The Industrial Movement in Ireland in* 1852; *Rome and its Ruler; The Irish in America; Life of Father Mathew*, and *The Next Generation*.

MAG'YAR. See HUNGARY.

MAHABHÂRATA (from the Sanskrit *mahat*—changed to *mahâ*—great, and *Bhârata*) is the name of one of the two great epic poems of ancient India. For the other, see the article RÂMÂYAN'A. As its main story relates to the contest between two rival families, both descendants of a king, Bharata, the word Mahâbhârata probably implies "the great history of the descendants of Bharata;" for another explanation of the word, which connects it with *bhâra*, weight, was obviously invented merely to convey an idea of the enormous extent of this poem. According to this explanation, it would mean the "very weighty (poem)," because, "when weighed, it was found to be heavier than all the four Vedas together with their mystical writings." However devoid of grammatical value this popular account of the word Mahâbhârata may be, it does not exaggerate the bulk of this epos, which, in its present condition, consists of upwards of 100,000 verses, each containing 32 syllables; while, if a tradition, reported in the introduction to the work itself, could be trusted, it was formerly known in other recensions of a still greater extent. In its actual shape, it is divided into 18 parvans or books, the *Harivansa* (q.v.) being considered as a supplementary part of it. That this huge composition was not the work of one single individual, but a production of successive ages, clearly results from the multifariousness of its contents, from the difference of style which characterizes its various parts, and even from the contradictions which disturb its harmony. Hindu tradition ascribes it to *Vyâsa;* but as Vyâsa means "the distributer or arranger;" and as the same individual is also the reputed compiler of the Vedas, Purânas, and several other works, it is obvious that no historical value can be assigned to this generic name. The contents of the Mahâbhârata may be distinguished into the leading story and the episodical matter connected with it. The former is probably founded on real events in the oldest history of India, though in the epic narrative it will be difficult to disentangle the reality from the fiction. The story comprises the contest of the celebrated families called the Kauravas and Pândavas, ending in the victory of the latter, and in the establishment of their rule over the northern part of India. Kuru, a descendant of Bharata, had two sons, Dhritarâshtra and Pându. The sons of the former, commonly called the *Kauravas*, were a hundred in number, the eldest of them being Duryodhana; those of Pându—the *Pândavas*—were five, Yudhishthira, Bhîma, Arjuna, and the twins Nakula and Sahadeva. Pându having resigned his throne, Dhritarâshtra, though blind, assumed the government, and ultimately divided his kingdom between his sons and the sons of Pându. The former, however, coveting the territory allotted to the Pându princes, endeavored to get possession of it. A game of dice was the means by which they bound over their cousins to relinquish their kingdom, promising, however, to restore it to them if they passed twelve years in the forests, and a thirteenth year in such disguises as to escape detection. This promise was faithfully kept by the Pândavas; but the term of their banishment having expired, the Kuru princes refused to redeem their word. A war ensued, ending in the complete destruction of the Kauravas. These are the meager outlines of the leading story of the Mahâbhârata, where, as may be inferred, Duryodhana and his brothers are pictured as the type of all conceivable wickedness, and the Pându princes as paragons of virtue and heroism. That the latter are the incarnations of sundry deities—that the gods take an active part in the development of the plot, in short, that Hindu mythology is always interwoven with these stirring

events of semi-historical Hindu antiquities, requires no further remark to any one but slightly acquainted with Hindu poetry. It is necessary, however, to observe that out of the 100,000 verses which constitute the great epos, barely a fourth part is taken up by this narrative; all the rest is episodical. The matter thus, as it were, incidentally linked with the main story, may be distributed under three principal heads, passing over such minor additions as fables, genealogical lists, geographical enumerations, and the like. One category of such episodes comprises narratives relating to the ancient or mythical hystory of India, as, for instance, the episodes of Nala and Sakuntalâ; a second is more strictly mythological, comprising cosmogony and theogony; a third is didactic or dogmatic—it refers to law, religion, morals, and philosophy, as in the case of the celebrated Bhagavadgîtâ, and the principal portions of the 12th and 13th books. By means of this episodical matter, which at various periods, and often without regard to consistency, was superadded to the original structure of the work, the Mahâbhârata gradually became a collection of all that was needed to be known by an educated Hindu; in fact, it became the encyclopædia of India. "There is no narrative on earth," the Mahâbhârata says of itself, "that is not founded on this epos. . . . . The twice-born, though knowing the four Vedas and their supplementary sciences, has no wisdom unless he knows this great epos. . . . . It is the great manual of all that is moral, useful, and agreeable." Yet it should be noticed that the Brahmanic authors of the great epos intended it especially as an encyclopædia for the Kshattriya or military caste; for it is chiefly the history, the interests, the religion, and the duties of the second caste which are taught in it, always, of course, with a view of establishing the superiority of the Brahmanic caste. Sectarian religion is for this reason not emphasized in the Mahâbhârata, though the later sectarian works (see PURÂNA) have largely drawn, for their purposes, on the mythological material afforded them by the great epic work. The text of the Mahâbhârata has been published in Calcutta in four quarto volumes (1834–39), to which is added a fifth volume, containing a table of contents. Two other editions are in the course of publication at Bombay. The best researches on the Mahâbhârata are those of Lassen, in his *Zeitschrift für die Kunde des Morgenlandes* (1837, ff.), and in his *Indische Alterthumskunde*. A sort of analysis of the leading story of the Mahâbhârata (not of the episodes) is given in Eichhoff's *Poésie Héroïque des Indiens* (Paris, 1860), and by Prof. Monier Williams (*Indian Epic Poetry*, London, 1863). See also Talboys Wheeler's *History of India* (1867).

MAHÂDEVA ("the great god") is one of the usual names by which the Hindu god Si'va is called. (His consort, Durgâ, is similarly styled *Mahâdevî*, ("the great goddess.") In Buddhistic history. Mahâdeva, who lived 200 years after the death of the Buddha S'âkyamuni, or 343, is a renowned teacher who caused a schism in the Buddhistic church. His adversaries accuse him of every possible crime, but as he is ranked among the Arhats, his eminence cannot be matter of doubt. The school founded by him is called *Púrvasaila*. See W. Wassiljew, *Der Buddhismus*, etc. (St. Petersburg, 1860).

MAHÂKÂS'YAPA, one of the most renowned disciples of the Buddha S'âkyamuni. He arranged metaphysically the portion of the sacred writings of the Buddhists called Abhidharma; and tradition ascribes to him also the origin of the *Sthavira* division of the *Vaibhâshika* school of Buddhistic philosophy. Many legends are connected with his life.—See E. Burnouf, *Introduction à l'Histoire du Buddhisme Indien* (Paris, 1844), and his posthumous work, *Le Lotus de la Bonne Loi* (Paris, 1852).

MAHAN', ASA, D.D., b. in Vernon, N.Y., in 1799; graduated at Hamilton college in 1824, and at Andover theological seminary in 1827; in 1829 became pastor of a Presbyterian church in Pittsford, N.Y., and of a church of the same denomination in Cincinnati in 1831; became president and professor of philosophy at Oberlin in 1835; was president of Cleveland university from 1850–56; pastor of a Congregational church in Jackson, Mich., from 1856–58, and of another at Adrian from 1858–61; and president of Adrian college from 1861–71. His principal works are, *The Scripture Doctrine of Christian Perfection;* the *Science of Intellectual Philosophy;* the *Doctrine of the Will;* the *Science of Moral Philosophy;* the *Science of Logic;* and *Modern Mysteries Explained and Refuted*—the latter directed against spiritualism. He has written also a work of some size in the department of military criticism.

MAHAN, DENNIS HART, LL.D., 1802–71; b N.Y.; educated at West Point, and appointed to the army in the engineer corps. In 1825 he was made assistant professor of mathematics at the academy; and in 1832, after four years of study abroad, professor of military engineering, and remained at West Point in that capacity till his death, which occurred by suicide in a fit of temporary insanity. He stood high in his profession, and he wrote a number of text books on civil and military engineering, which came into general use in schools and colleges in the United States. His *Treatise on Field Fortifications* appeared in 1836, and was supplemented in 1865, by *Military Mining and Siege Operations*, the two constituting parts I. and II. respectively, of *An Elementary Course of Military Engineering*. He also published *An Elementary Course of Civil Engineering* in 1837, which he rewrote and revised in 1868; *Advanced Guard, Outpost, and Detachment Service of Troops*, 1847; *Elementary Treatise on Industrial Drawing*, 1853; *Descriptive Geometry*, 1864; and an edition of Moseley's *Mechanical Principles of Engineering and*

Architecture, 1856. Brown university, Dartmouth college, and William and Mary college conferred upon him the degree of LL.D.

MAHAN, MILO, D.D., 1819–70; b. Suffolk, Nansemond co., Va.; was educated at St. Paul's college, Flushing, L.I.; took orders in the Protestant Episcopal church in 1845; became rector of Grace church, Jersey City, in 1848; and in 1850 assistant minister of St. Mark's church, Philadelphia; was elected professor of church history in the Episcopal general theological seminary in New York in 1851, which position he held for 13 years. In 1864 he became rector of St. Paul's church, Baltimore. His published works are *The Exercise of Faith; History of the Church the First Three Centuries; Reply to Colenso; Palmoni, a Free Inquiry; Comedy of Canonization.* The Rev. J. Hopkins collected and published his works, with a memoir, in 3 vols.

MAHANNUD'DY (more accurately, MAHANADI), a river of India, rises on the s.w. border of the presidency of Bengal, in lat. 20° 20′ n., long. 82° east. After an eastward course of 520 m., 300 m. of which are navigable, having divided into several branches at the town of Cuttack, which forms the head of its delta, it flows e. and s.e. through the district of that name, and falls by several mouths into the bay of Bengal.

MAHANOY' CITY, a t. in Schuylkill co., Penn.; 80 m. from Philadelphia; pop. 5,553; situated in the valley of the same name and in the neighborhood of extensive coal fields, in the mining of which and trades connected with it the people of the city are mainly occupied.

MAHÂSÂNGHIKA is the name of one of the two great divisions of the Buddhistic church which arose 200 years after the death of the Buddha S'âkyamuni, or about 343, caused, as it seems, by the schism of Mahâdeva (q.v.). For the other division, see STHAVIRA. Out of the Mahâsânghika school arose, in the course of the next centuries, numerous sects. For the tenets common to all, and for those peculiar to each of these sects, the special student of the Buddhist religion will at present most advantageously consult the work of prof. W. Wassiljew, *Der Buddhismus, seine Dogmen, Geschichte und Literatur* (St. Petersburg, 1860).

MAHAS'KA, a co. in s.e. Iowa, watered by the Des Moines and forks of the Skunk rivers, and traversed by the Central and Des Moines Valley railroads; 576 sq.m.; pop. '80, 25,201. The surface is chiefly prairie land, with wooded intervals. The soil is fertile, producing largely of wheat, Indian corn, oats, hay, and potatoes. Considerable wool is grown; the number of cattle, sheep, and swine is large, and there are some quite important manufactories. Co. seat, Oskaloosa.

MÂHAVANSA is the title of two celebrated works written in Pâli, and relating to the history of Lankâ, or Ceylon (q.v.), from its earliest period down to the reign of Mahâsena, who died 302 after Christ. The older work was probably composed by the monks of the convent Uttaravihâra at Anurâdhâpura, the capital of Ceylon. Its date is uncertain; but it has apparently preceded the reign of Dhâtusena (459–477), as that monarch ordered it to be read in public, a circumstance which seems to prove the celebrity it enjoyed already at his time.—The later work of the same name is an improved edition and continuation of the former. Its author, *Mahânâma*, was the son of an aunt of the king Dhâtusena, and he brings down the history of Ceylon, like his predecessor, to the death of Mahâsena. A first volume of the text of the latter work, "in Roman characters, with a translation subjoined, and an introductory essay on Pâli Buddhistic literature," was published by the Hon. George Turnour (Ceylon, 1837). See also Lassen, *Indische Alterthumskunde*, vol, ii. p. 15, ff. (Bonn, 1852).

MAHAVIRA (literally, "the great hero"), also called *Vîra* and *Vardhamâna*, is the 24th or last Jina, or deified saint, of the Jainas (q.v.), described as of a golden complexion, and having a lion for his symbol. His legendary history is given in the *Kalpa-Sûtra* (q.v.) and the *Mahavîra-Charitra*, two works held in great authority by the Jainas. According to these works, Mahâvîra's first birth occurred at a period infinitely remote; it was as nayasâra, head man of a village, that he first appeared in the country of Vijaya, subject to S'atrumardana. He was next born as *Marîchi*, the grandson of the first Jaina saint *Rishabha*; he then came to the world of Brahmâ, was reborn as a worldly-minded Brâhman'a, and after several other births—each being separated from the other by an interval passed in one of the Jaina heavens, and each period of life extending to many hundreds of thousands of years—he quitted the state of a deity to obtain immortality as a saint, and was incarnate towards the close of the fourth age (now past), when 75 years and 8½ months of it remained. After he was 30 years of age he renounced worldly pursuits, and departed, amidst the applauses of gods and men, to practice austerities. Finally, he became an Arhat or Jina; and at the age of 72 years, the period of his liberation having arrived, "he resigned his breath," and his body was burned by Indra and other deities, who divided amongst them such parts as were not destroyed by the flames, as the teeth and bones, which they preserved as relics; the ashes of the pile were distributed amongst the assistants: the gods erected a splendid monument on the spot, and then returned to their respective heavens. At what period these events occurred is not stated, but judging from some of the circumstances narrated, the last Jina expired about 500 years before the Christian era. Other authorities make the date of this event about a century

and a half earlier. The works above referred to state, with considerable detail, the conversions worked by Mahâvîra. Among the pupils were *Indrabhûti* (also called Gautama, and for this reason, but erroneously, considered as the same with the founder of the Buddhist religion), *Agnibhûti*, *Vâyubhûti*—all three sons of Vasubhûti, a Brâhman of the Gotama tribe, and others. These converts to Jaina principles are mostly made in the same manner: each comes to the saint prepared to overwhelm him with shame, when he salutes them mildly, and, as the Jainas hold, solves their metaphysical or religious doubts. Thus Indrabhûti doubts whether there be a living principle or not; Vâyubhûti doubts if life be not body; Man'd'ita has not made up his mind on the subjects of bondage and liberation; Achalabhrâtr'i is skeptical as to the distinction between vice and virtue; and so on. Mahâvîra removes all their difficulties, and by teaching them the Jaina truth, converts them to the doctrine of his sect. For a summary account of the life of this saint, see H. T. Colebrooke's *Miscellaneous Essays*, vol. ii. p. 213, ff.; H. H. Wilson's works, vol. i. p. 291, ff.

MAHIM', a t. of the island of Bombay, and 7 m. n. of the city of Bombay, to which it is joined by railway. It is situated on the s. side of the channel separating the island from Salsette, and at the point where they are connected by a road running partly on arches of masonry, partly on a causeway. The passage is commanded by a fort. The town is ill-built, and inhabited chiefly by Christians of Portuguese descent, who have here a church and some other relics of their former prosperity. The inhabitants are chiefly employed in fishing, the place being famous for its oysters. Pop. 9,000.

MAHMOOD (or MAHMÛD) OF GHIZNI (ABUL-KASIM-YEMINED-DAULAH), Sultan of Persia. See GHIZNEVIDES, *ante*.

MAHMUD II., Sultan of Turkey, and younger son of sultan Abdul-Hamid, was b. July 20, 1785, and on the deposition of his brother, Mustafa IV., by Baïraktar, pasha of Ruschuk, was raised to the throne, July 28, 1808. Baïraktar became his grand vizier, and vigorously aided him in his attempts to reform the constitution of the Turkish army. But the Janizaries, emboldened by their successful opposition to the same attempt on the part of Selim III., rose in rebellion, and the murder of the vizier put a stop for the present to the carrying out of any military reforms. Mahmud was also attacked by the rebels, but he secured his life and throne by the destruction of all the other members of the royal house of Osman. The war with Russia now commenced vigorously; but after a conflict of three years' duration, which completely prostrated the strength of Turkey, peace was concluded at Bucharest (q.v.). The daring and energetic Mahmud now applied himself to the subjugation of the semi-independent pashas of the outlying provinces, and to the promotion of radical reforms in all departments of the government. The rebellion of the Wahabis was crushed through the instrumentality of Ibrahim Pasha in 1818, and Ali Pasha (q.v.), "the lion of Janina," was overthrown in 1822. Greece revolted in 1821, and its independence was secured by the battle of Navarino in 1827, but it was not recognized as a separate kingdom by Turkey till April, 1830. During the progress of the Greek revolution, Mahmud had been steadily though secretly maturing his plans of military reform, and in June, 1826, the success of his schemes was crowned by the destruction of the Janizaries (q.v.). The consequent confusion into which Turkey was thrown was immediately taken advantage of by Russia for obtaining fresh concessions. Mahmud, however, despite these interruptions, proceeded with iron resolutions in those plans of reform which he judged essential to the stability of the empire; and the disastrous termination of the succeeding war with Russia (1828–29), far from interfering with his projects, only stimulated him to renewed exertion. The successful revolt of the Greeks, and the late triumph of the Russians, together with the disaffection manifested by the Christian population of Turkey, excited in the ambitious mind of Mehemed Ali, pasha of Egypt, the desire for independence. See MEHEMED ALI. The war which ensued was from first to last in favor of the Egyptians; but the intervention of Russia compelled both parties to agree to a treaty (1833) which was satisfactory to neither. Mahmud was now forced to grant fresh concessions to his "good friend and ally" the czar, by the treaty of Unkiar-Skelessi (q.v.), July 8, 1833, and by another treaty in the following year. He was again at liberty to pursue his reforms in the civil administration, the principal improvements being the modification and readjustment of the more oppressive taxes, the formation of a militia on the principle adopted by England, the establishment of schools of anatomy and painting, increased privileges to Frankish merchants, and the abolition of the export duty on grain, measures of sound policy, which tended largely to consolidate the new-born prosperity of Turkey. In 1838 he concluded with Great Britain a commercial treaty, which both strengthened the connection between the two nations and advanced their mercantile interests. In 1839 he renewed the war with Mehemed Ali, but died before its conclusion, July 1, 1839, after an eventful reign of 31 years.

MAHOGANY, the wood of the trunk of the *swietenia mahagoni*, a tree of 80 to 100 ft. high, belonging to the natural order *cedrelaceæ*, a native of the West Indies and of South America. It has pinnate leaves with 3 to 5 pairs of leaflets, and panicles of small whitish or yellow flowers, the stamens united into a tube which is toothed at the summit, and set round on the inside with 8 to 10 anthers. The capsule is 5-celled, about the size of a man's fist, hard, woody, and oval, and the seeds are winged at the apex. It

attains an immense size, second to few others, and its timber is generally sound throughout in the largest trees. The slow progress which it is observed to make, clearly indicates that the trees which are cut for use must have attained a great age: 200 years has been assumed as an approximation. It is most abundant on the coast of Honduras and around Campeachy bay, whence the greater portion of that used in Europe is exported. St. Domingo and Cuba also yield a considerable quantity, which is of a finer quality than that obtained from the mainland, which is frequently called bay wood, to distinguish it from the Cuba mahogany, usually called Spanish. The occupation of cutting this timber and removing it to the coast for shipment is exceedingly laborious, and employs a large number of men and oxen. The wood varies much in value, according to the color and beauty of curl; singie logs have occasionally realized as much as £1000 for cutting into veneers, in which state it is very generally used, its great weight and value unfitting it for being always employed solid. It was first introduced into England by accident in 1597, having been used to repair one of sir Walter Raleigh's ships at Trinidad; but although the wood so employed was much admired, it did not become an article of commerce until rather more than a century later, when another accidental circumstance brought it into demand, and it became an article of luxury, and has since maintained the highest position as a cabinet-maker's wood. The annual imports into Britain are over 50,000 tons, exceeding half a million sterling in value. The bark has a faint aromatic smell, and a very astringent bitter taste, and in the countries where the tree grows is used as a medicine. In England it has been recommended and used under the name *mahogany bark*, or *amaranth bark*, as a substitute for Peruvian bark.—EAST INDIA MAHOGANY is the timber of the *rohuna tree* (*soymida febrifuga*), and AFRICAN MAHOGANY of the *khaya senegalensis*, both of the order *cedrelaceæ*.

MAHOMET. See MOHAMMED, *ante*.

MAHON, Viscount. See STANHOPE, EARL, *ante*.

MAHONE, WILLIAM, b. in Southampton, Va., about 1827, and graduated at the Virginia military institute in 1847; adopted the profession of a civil engineer; constructed the Norfolk and Petersburg railroad; assisted in the capture by the rebels of the Norfolk navy yard, April 21, 1861; raised and commanded a regiment of Virginia soldiers in the confederate army; was in most of the battles of the peninsular campaign, and in command at Bermuda Hundred at the time of Lee's surrender. He was promoted to the rank of maj.gen. in 1864. After the war he was engaged in the management of several lines of railroad in Virginia. In 1880 he was elected to the senate of the United States as the successor of Robert E. Withers. The question of the extinguishment of the public debt, which was complicated by the relations of Virginia and West Virginia, had been at issue during every year since 1873, when terms for its equitable adjustment had been agreed upon. These terms, however, not proving satisfactory to a large proportion of the population of the state of Virginia, were not carried out, and two strong parties were formed under the names, respectively, of "debt-payers" and "readjusters," of the latter of which gen. Mahone became the leader and the most active spirit. The "readjusters," while recognizing the just liability of Virginia for her just debts, denied the right of her taxation for that portion of the debt which should attach to West Virginia, opposed over-taxation, declared in favor of the protection of the public free schools, and advocated reform and economy.

MAHO'NIA. See BARBERRY.

MAHO'NING, a co. in n.e. Ohio, watered by the Mahoning and Little Beaver rivers, and intersected by the Atlantic and Great Western, and Pittsburg, Fort Wayne, and Chicago railroads; 423 sq.m.; pop. '80, 42,867. The surface is undulating, and the soil very fertile. The productions are: wheat, Indian corn, potatoes, oats, hay, wool, butter, flax, and flax-seed. There are a number of iron foundries and furnaces, rolling mills, flour mills, saw mills, and tanneries. Co. seat, Canfield.

MAHO'NY, FRANCIS, 1805–66; b. Ireland; educated at the Jesuit college in Paris, and at Rome, where he entered the priesthood of the Roman Catholic church. He tried, but in vain, to find employment in his profession; and he then went to London, and devoted himself to literature and journalism. He contributed to *Fraser's Magazine* for 1836, under the pseudonym of "Oliver Yorke," a series of papers which were afterwards published in book form as *The Reliques of Father Prout*. They are conceived in the spirit of Wilson's *Noctes Ambrosianæ*, and show considerable learning and humor, and a talent for comic verse and parody. He was the first Roman correspondent of the *Daily News*, and his letters from Rome to that journal were published in 1849 under the name of *Facts and Figures from Italy*. He lived at Paris for many years as correspondent of the London *Globe*, but in 1864 he entered a monastery, where the last two years of his life were passed.

MAHOPAC', LAKE, one of a group of 22 lakes in Putnam co., N. Y., 1800 ft. above the level of the sea, 9 m. in circumference, a favorite resort for summer excursionists. It is in the midst of picturesque scenery, and offers advantages of good boating and fishing.

MAHRAT'TAS, a people of Hindu race, inhabiting central India, s. of the Ganges, from Gwalior to Goa, and supposed by many to be the descendants of a Persian or North

Indian people, who had been driven southwards by the Mongols. They are first mentioned in history about the middle of the 17th c., when they possessed a narrow strip of territory on the w. side of the peninsula, extending from 15° to 21° n. latitude. The founder of the Mahratta power was Sevaji, a freebooter or adventurer, whose father was an officer in the service of the last king of Bejapûr. By policy or by force he eventually succeeded in compelling the several independent chiefs to acknowledge him as their leader, and with the large army then at his command overran and subdued a large portion of the emperor of Delhi's territory. His son and (1680) successor, Sambaji, after vigorously following out his father's policy, was taken prisoner by Aurungzebe in 1689, and put to death. The incapacity of the subsequent rulers who reigned under the title of *ramrajah* ("great king"), tempted the two chief officers of state, the *peishwa*, or prime minister, and the paymaster-gen., to divide the empire between them. This was effected about 1749, the former fixing his residence at Poona, and retaining a nominal supremacy over the whole nation of the Mahrattas; while the latter made Nagpûr his capital, and founded the empire of the Berar Mahrattas. This paction, of course, required the sanction of the more important among the minor chiefs and officers of state, who gave their consent on condition of receiving a share of the spoil. The ultimate result was the partition of the Mahratta kingdom into a great number of states, more or less powerful and independent; chief among which were, besides the two above mentioned, Gwalior, ruled by the Rao Scindia; Indore, by the Rao Holkar; and Baroda, by the Guicowar. It was to be expected that the usual intestine wars would supervene, and ultimately the East India company was compelled to interfere. The invasion of the Delhi empire by Nadir Shah afforded these wild and warlike mountaineers an opportunity, of which they eagerly availed themselves, to wrest additional territory from the feeble grasp of the Mogul emperor. From this time they discharged the office of arbiters in the quarrels between the emperor, his vizier, and his rebellious subjects; but the frightful defeat (Jan., 1761), they sustained at the hands of Ahmed Shah Abdalli, the ruler of Afghanistan, on the field of Paniput, where they lost 50,000 men, and all their chiefs except Holkar, weakened their power for a time. They still, however, continued to be the hired mercenaries of the Delhi emperor, till the growing influence of the British compelled them to look to their own safety. After many long and bloody contests with the British and their allies, in which sometimes the whole, but more frequently a portion of the Mahrattas joined, they were one by one, with the exception of Scindiah, reduced to a state of dependence. This last-mentioned chief, having raised a powerful army, officered by Frenchmen, and disciplined after the European method, continued the contest for a number of years, till his power was finally broken in 1843. The dignity of Peishwa was abolished in 1818, and his territories were occupied by the British, with the exception of a portion which was made over to another Mahratta chief, the Rajah of Sattara, their faithful ally; Nagpûr and Sattara subsequently reverted to the British government, but the other chiefs still possess extensive dominions, under British protection.

The Mahrattas are a vigorous and active race, and though diminutive and ill-formed are distinguished for their courage. They are of a cruel and perfidious disposition, and have exercised a most disastrous influence upon the inhabitants of the countries they have conquered. Though devout worshipers of Brahma, no distinctions of caste exist among them.

MAI, ANGELO, CARDINAL, a distinguished editor and scholar, was born in the village of Schilpario, in Lombardy, Mar. 7, 1782. He was educated and lived till 1808 in establishments belonging to the Jesuits; but obtained an appointment, first as associate, and ultimately as doctor, in the celebrated Ambrosian library at Milan. His career as an author dates from this appointment. In 1813 he published a translation and commentary of Isocrates, *De Permutatione;* but his reputation is due much more to his publications of the palimpsests or re-written manuscripts, the first specimens of which he issued at Milan (see PALIMPSEST). His earliest publications in that line were fragments of *Cicero's Orations;* of the *Vidularia*, a lost play of Plautus; of *Letters of Fronto*, Marcus Aurelius's preceptor; the *Chronicon* of Eusebius, and other less important works, which, however, were entirely eclipsed by his well-known edition and restoration of the *De Republica* of Cicero, published in 1820. Meanwhile, Mai had been invited to Rome by Pius VII., and named to the charge of the Vatican library, together with other honorable and emolumentary appointments. He at once turned his attention to the unedited MSS. of the Vatican, and after a short examination of this noble collection, undertook, as the mission of his life, the task of publishing those among them which had been overlooked by earlier editors, or had escaped their notice. This task he steadily pursued; and although he was appointed, in 1833, to the onerous office of secretary of the propaganda, and, in 1838, to the cardinalate itself, his Roman publications form a collection of an extent and importance almost unexampled in modern times. His first series was in 10 4to vols., entitled *Scriptorum Veterum Nova Collectio, e Vaticanis Codicibus edita* (Rome, 1825). It consists, like the great collections of Mabillon, Montfaucon, D'Achery, and others, of miscellaneous unpublished works, partly sacred, partly profane, and indifferently in the Greek and the Latin languages, comprising an entire volume of palimpsest fragments of the Greek historians, Polybius, Diodorus, Dion,

Dionysius, and others. The succeeding collections, viz., *Classici Auctores ex Codicibus Vaticanis* (10 vols. 8vo, 1838), *Spicilegium Romanum* (10 vols. 8vo, 1839–44), and *Nova Patrum Bibliotheca* (6 vols. 4to, 1853), are all on the same plan, and all equally replete with new and interesting materials. For many years, too, he was engaged in preparing an edition of the celebrated *Codex Vaticanus*, which he had printed, but the publication of which was postponed, awaiting the preparation of his intended preliminary dissertations. He died, however, rather unexpectedly, at Albano, Sept. 8, 1854; and as no trace of the expected preliminary matter was found among his papers, the edition was published (1857) entirely without critical matter. It has, in consequence, disappointed expectation. His library, which he directed to be sold for the use of the poor of his native village, was purchased by the pope for the Vatican library.

MAIDEN, THE, a name given to a machine for beheading criminals, which was in use in Scotland from about the middle of the 16th c. to nearly the end of the 17th century. It is said to have been introduced into Scotland by the regent Morton, who had seen it at Halifax, in Yorkshire, and was himself the first to suffer by it, whence the proverb, "He that invented the maiden first handselled it." Morton, for anything that is known to the contrary, may have introduced the maiden; but he certainly was not its first victim. Fifteen years before he was put to death by it (1581 A.D.) it was employed to behead Thomas Scott of Cambusmichael, one of the murderers of Rizzio (1566 A.D). It would seem at first to have been called indifferently "the maiden" and "the widow"—both names, it may be conjectured, having their origin in some such pleasantry as was glanced at by one of the maiden's last victims, the earl of Argyle (1681 A.D.), when he protested that it was "the sweetest maiden he had ever kissed." A frightful instrument of punishment used in Germany in the middle ages was called "the virgin." But it had no resemblance to the maiden, which was exactly like the French guillotine (q.v.), except that it had no turning-plank on which to bind the criminal. The maiden which was used in the Scottish capital is now in the museum of the antiquaries of Scotland at Edinburgh. A figure of it is given in the article GUILLOTINE.

MAIDENHAIR (*Adiantum Capillus-Veneris*), a small, delicate, and graceful fern, with bipinnate fronds, alternate obovate and wedge-shaped membranaceous pinnules on capillary stalks, and marginal *sori* hidden beneath oblong *indusia;* growing on moist rocks and old walls, especially near the sea; rare in Britain, but very abundant in the south of Europe, where it covers the inside of wells and the basins of fountains (as at Vaucluse) with a tapestry of the most delicate green. Another species of the same genus, *A. pedatum*, a native of North America, with *pedate* leaves, has a sweet, fragrant root-stock, of which *Capillaire* (q.v.) is made. It is supposed that the name maidenhair originated in the use of a mucilage made from this fern by women for stiffening their hair. This name is sometimes applied also to some species of spleenwort (*Asplenium*), as *A. adiantum nigrum* and *A. trichomanes.*

MAIDENHEAD, a municipal borough and market-town of England, in the county of Berks, is situated amid beautiful scenery, on the right bank of the Thames, 26 m. w. of London. It carries on some trade in meal, malt, and timber, and has a large brewery. Pop. '71, 6,173.

MAIDS OF HONOR. See LADIES OF THE QUEEN'S HOUSEHOLD.

MAID'STONE (old form, *Medwegston*), the county town of Kent, England, on the right bank of the Medway, 43 m. from London by the south-eastern railway. It is a municipal and parliamentary borough, and return 2 members to parliament. It stands in a noted corn-district; its grain-market is the most important in the county; and in the vicinity are the famous hop-grounds known as "the middle growth of Kent." The parish church, built toward the close of the 14th c., in the perpendicular style, contains many interesting tombs. The remains of the college or hospital of All-Saints, which grew out of a hospital founded in 1260 at the entrance of the town for the benefit of pilgrims traveling to Canterbury, are highly picturesque. Maidstone has numerous educational and other institutions. An extensive oil, and several paper mills, sacking and twine manufactories, and several breweries, are in operation. Pop. of parliamentary borough '71, 26,237.

MAI'GRE, *Sciæna aquila*, a fish of the acanthopterous family *sciænidæ*, common in the Mediterranean sea, but a rare visitant of the British shores. It attains a large size, being seldom taken less than 3 ft., whilst it is sometimes 6 ft. long. In general appearance it much resembles a large bass, but the head is shorter and more rounded, and the tongue and roof of the mouth are destitute of teeth. The maigre is in very high esteem for the table, and the head is a favorite delicacy of epicures. The strength of the maigre is such that a stroke of its tail will throw down a man; and when it is taken, the fishermen therefore quickly stun it by a blow on the head. It is one of those fishes which emit a peculiar sound, which has been described as a kind of purring or buzzing, and has been heard from a depth of 120 feet. Fishermen have been guided by this sound to let down their nets so as to inclose a number of maigres. The maigre appears to be the *umbrina* of the Romans, and was highly esteemed by them. The stones of its ears were formerly set in gold, and worn on the neck, imaginary virtues being ascribed to them,

particularly in the cure of colic; but it was requisite that they should be obtained as a gift, and not by purchase.

MAIL (Fr. *maille*, It. *maglia;* from the Lat. *macula*, a spot, hole, or mesh of a net) signifies a metal net-work, and is ordinarily applied to such net-work when used as body defensive armor. Well-made mail formed an admirable defense against all weapons except firearms, and its pliability and comparative lightness gave it favor over the more cumbrous plate-armor.

MAIL. See POST-OFFICE.

MAILED CHEEKS, *Sclerogenidæ* or *triglidæ*, a family of acanthopterous fishes, distinguishingly characterized by an enlargement of certain bones of the head and gill-covers to form a bony armor for the cheeks. They exhibit great variety of forms; some of them are remarkable for their elegance and for their delicate or splendid hues, other for their extreme ugliness. Gurnards (q.v.) are among the best known and most valuable of this family. To it belong also bull-heads (q.v.) and *scorpænæ* (q.v.). Stickle-backs (q.v.) are sometimes referred to it. The species are widely distributed in the seas of all parts of the world; a few inhabit lakes and rivers.

MAIMATCHIN, a trading t. on the northern boundary of Mongolia, opposite Kiahta (q.v.).

MAIMING is the shooting, stabbing, or otherwise seriously injuring of a person, and therefore, when treated as a criminal offense, properly belongs to the heads of assault, attempt to murder, and offenses against the person generally. Maiming cattle is classed under the head of malicious injuries to property.

MAIMON'IDES, or rather MOSES BEN MAIMON (RAMBAM=RABBI MOSES BEN MAIMON) B. JOSEPH B. ISAAC B. JOSEPH B. OBADJAH, etc.; Arab. ABEN AMRAN (AMRU) MUSA IBN ABDALLAH IBN MAIMON AL-KORTOBI, was b. at Cordova, Mar. 30, 1135. Little is known of his early life, which fell in the troublous period of the Moravide rulers. His first instruction he received at the hand of his father, himself a learned man, and author of several important works in Arabic and Hebrew. Under the guidance of the most distinguished Arabic masters of the time, Maimonides then devoted himself to the study of Greek (Aristotelian) philosophy, the science of medicine, and theology. When, in 1148, Abd-al-Mumen, the successor of Abdallah, in the newly established reign of the Al-Mohads (Unitarians), took Cordova, and, shortly afterwards, subjected all Andalusia, both Jews and Christians residing there were forced either to profess Islam or to emigrate. Maimonides's family, however, together with many others to whom emigration was well-nigh impossible, outwardly embraced the Mohammedan faith, or rather for the time being renounced the public profession of Judaism, all the while remaining faithful to it in secret, and keeping up a close communication with their co-religionists abroad, an arrangement in which the government readily acquiesced, since it fully answered their purpose. For more than 16 years Maimonides thus lived together with his whole family under the assumed character of Mohammedans; but when the death of the reigning sovereign brought no change in the system of religious intolerance, they resolved to emigrate. In 1165 they embarked, went to Acco, and, by way of Jerusalem, to Cairo, where Maimonides's father died. Maimonides settled in Fostât (Old Cairo), where for some time he gained his livelihood by the jewel-trade, until his great medical knowledge procured him the high office of physician to Salah Eddin, the reigning sultan of Egypt. Maimonides's importance for the religion and science of Judaism, and his influence upon their development, is so gigantic, that he has rightly been placed second to Moses, the great law-giver, himself. He first of all brought order into those almost boundless receptacles of tradition, and the discussions and decisions to which they had given rise, which, without the remotest attempt at system or method, lie scattered up and down the works of Haggada and Halacha—Midrash, Mishnah, Talmuds. Imbued with the spirit of lucid Greek speculation, and the precision of logical thought of the Arabic Peripatetics Maimonides, aided by an enormous knowledge, became the founder of rational Scriptural exegesis. The Bible, and all its written as well as implied precepts, he endeavored to explain by the light of reason, with which, as the highest divine gift in man, nothing really divine could, according to his theory, stand in real contradiction. The miracles themselves, though not always traceable to their immediate cause, yet cannot be wrought in opposition to the physical and everlasting laws in nature. Where literal interpretation seems to jar upon the feelings of reverential awe towards the Highest Being, there an allegorical explanation is to be adopted unhesitatingly. Respecting Maimonides's philosophical system, we can barely hint in this place at its close similarity with that of Averroes; both drawing from the same classical sources, and arriving independently, and with individual modifications, to nearly the same views on the great problems of the universe. Holding reason in man—if properly developed and tutored by divine revelation—to be the great touch-stone for the right or wrong of individual deeds, Maimonides fully allows the freedom of will, and while he urges the necessity, nay, the merit of listening, to a certain degree, to the promptings of nature, he rigorously condemns a life of idle asceticism, and dreamy, albeit pious contemplation. No less is it, according to him, right and praiseworthy to

pay the utmost attention to the healthy and vigorous development of the body and the care of its preservation by the closest application to hygienic rules. Providence, Maimonides holds, reigns in a certain—broad—manner over humanity, and holds the sway over the destinies of nations; but he utterly denies its working in the single event that may befall the individual, who, subject above all to the great physical laws, must learn to understand and obey them, and to shape his mode of life and action in accordance with existing conditions and circumstances—the study of natural science and medicine being therefore a thing almost of necessity to everybody. The soul, and the soul only, is immortal, and the reward of virtue consists in its—strictly unbodily—bliss in a world to come; while the punishment of vice is the "loss of the soul."

Maimonides's first work of paramount import (several of his earlier minor writings treat of subjects of general science), begun in his twenty-third year, and finished ten years later, is his Arabic commentary of the Mishnah [translated in Hebrew by Judah Alcharisi, Tibbon (father and son), Salben Jacob, Net, Almâli, Jak. Akkasi, and others], which forms an extensive historical introduction to *Tradition*, or the Oral Law: tracing its development, its divisions, the plan of the Mishnah, and its complements, etc.; and this introduction has now, for more than five hundred years, been deemed so essential a part of the Talmud itself, that no edition of the latter is considered complete without it. This was followed by the *Sefer Hammizwoth*, or Book of the Precepts, in Arabic (translated into Hebrew by Abr. Ibn Chasdai, and, from the author's second edition, by Moses Tibbon), which contains an enumeration of the 613 traditional laws of the Halacha, together with 14 canons on the principle of numbering them, chiefly directed against the authors of certain liturgical pieces called *Asharoth* (Warnings); besides 13 articles of belief, and a psychological fragment. This book is to be considered chiefly as an introduction to the gigantic work which followed in 1180, under the title of *Mishne Thorah* (Second Law), or *Yad Chasakah* (Strong Hand), a Hebrew compendium in 982 chapters, embracing the entire Halacha, even those of its parts no longer in practical use, such as precepts regarding the soil of Judæa and the like, and which, with the most astounding minuteness, lucidity, and precision, places the results of the legal disquisitions gathered from the Talmudical labyrinths systematically arranged before the reader. The summit of his renown, however, Maimonides reached in his grand Arabic work, *Delalath Al-Hairin* (Heb. Moreh Nebuchim, "Guide of the Erring"), a philosophical exegesis (translated into Hebrew by Samual Tibbon, edited for the first time in the original by Munk, 1856, etc.), which, while on the one hand it has contributed more than any other work to the progress of rational development in Judaism, has on the other hand also become the arena for a long and bitter fight between orthodoxy and science—carrying out, as it did, to its last consequences the broad principle, that "the Bible must be explained metaphorically by established fundamental truths in accordance with rational conclusions." So bitter, indeed, was the contest which broke out between the subsequent spiritualistic Maimonidian and the "literal Talmudistic" schools, that the fierce invectives were speedily followed by anathemas and counter-anathemas issued by both camps; and finally, about the middle of the 13th c., the decision was transferred into the hands of the Christian authorities, who commenced by burning Maimonides's books, continued by bringing to the stake all Hebrew books on which they could lay their hands, and followed this decision up by a wholesale slaughter of thousands upon thousands of Jews, men, women, and children, irrespective of their philosophical views. Under these circumstances, the antagonistic parties, chiefly through the influence of David Kimchi and others, came to a reconciliation, and withdrew their mutual anathemas; and, as time wore on, Maimonides's name became the pride and glory of the nation, who bestowed upon him terms like the "Great Eagle," the "Light of Two Worlds," etc. Nor was his immense celebrity confined to the narrow pale of his own creed; as early as the 13th c. already, portions of his works, chiefly the *Moreh* (Doctor Perplexorum), became, in Latin versions, the text-books of European universities.

Maimonides himself only witnessed the beginning of the conflict, the proportions and violence of which he certainly never anticipated. At his death, which took place Dec. 13, 1204, the grief at the loss of the "Light of the Age" was universal in the east as well as in the west. And he has ever since been recognized universally as one of the noblest and grandest men of all times: gifted with the most powerful and brilliant qualities of mind, possessed of the most varied and astounding knowledge, and imbued with deep piety and true religion, borne aloft by undaunted energy and glowing zeal. His body was brought to Tiberias, and his tomb became a place of pilgrimage, even to his early foes.

Of Maimonides's smaller works, we may enumerate, in conclusion, a translation of Avicenna's *Canon;* an extract from Galen; several medical, mathematical, logical, and other treatises, spoken of with the highest praise by Arabic writers; legal decisions, theological disquisitions, etc. Portions of his great work, *Moreh*, have lately been translated into modern European languages, chiefly into German (Scheyer) and French (Munk).

MAIN (from the Latin *magnus*, great), the name applied on shipboard to the principal mast, and to all the parts belonging or adjacent to it—as, maintopmast, main-yard, main-stay, main-shrouds, main-hatchway, main-chains, etc.

MAIN, a river of Germany, the largest affluent the Rhine receives from the right, is formed by the union of two branches, the White and Red Main, 4 m. below Kulmbach, in Bavaria. The more important of these, the White Main, rises in the Fichtelgebirge, 2,800 ft. above sea-level. The Main has a winding westward course 300 m. in length, to the Rhine, into which it falls at Mainz. It is navigable for the last 220 miles. The principal towns on its banks are Schweinfurt, Würzburg, Aschaffenburg, Offenbach, and Frankfort; and its chief affluents are, on the right, the Saale, and on the left, the Regnitz. The Main is one of the most picturesque of German rivers; it flows through a beautiful country, where the hill-slopes are frequently covered with vineyards, and surmounted by castles. Its waters communicate with those of the Danube by means of the Ludwigs-Kanal. See BAVARIA.

MAINE, the most eastern of the five New England states in America, extends from lat. 42° 57′ to 47° 32′ n., and from long. 66° 52′ to 71° 6′ w., being 303 m. from n. to s., and 212 from e. to w., with an area of 35,000 sq.m., or 22,400,000 acres. Maine is bounded n. by Quebec, e. by New Brunswick, s. by the Atlantic ocean, and w. by New Hampshire and Canada. It has, on the s., a coast-line of 278 m. in a line, but so indented with bays as to make 2,486 miles. The largest of these bays are the Penobscot, Machias, Saco, Passamaquoddy, etc. Into these empty the rivers Penobscot Kennebec, Saco, Androscoggin, etc. Numerous islands stud the coast: the largest, Mount Desert, remarkable for its scenery, contains 60,000 acres. In the northern portions of the state are numerous lakes; the largest, Moosehead, being 35 m. long, and the source of the Kennebec river. The country is hilly, with a range of mountains stretching n.e. from the White mountains of New Hampshire; Mount Katahdin, near the center of the state, is 5,383 ft. high. On the coast are fine granite quarries; interior, metamorphic rocks and minerals, limestone and argillaceous slates. The climate ranges from 20° or 30° below to 100° above zero. The forests are rich in pine, spruce, hemlock, maple, etc.; and the chief agricultural products are potatoes, maize, oats, hay, barley, and apples. The rivers and coast abound in fish. One of the chief exports is lumber, and one-third of all the ships of America are built on the rivers and harbors of this state. The falls of the rivers furnish immense water-power for saw-mills and factories. Maine has over 1000 m. of railway, 64, banks, 4,565 public schools, 5 colleges, a theological hall, and 2 medical schools. The government consists of a governor, senate, and house of representatives, elected by universal suffrage. Maine was settled in 1621, and was a part of Massachusetts until 1820. In its early history it is said that every 20th settler was killed by the Indians. A controversy respecting the north-eastern boundary of Maine, which threatened to produce war with England, was settled by a compromise of claims in 1842. The chief towns are Portland, Augusta (the capital), Bangor, Bath, Hallowell, etc. Pop. in '60, 628,276; in '70, 626,915.

MAINE (*ante*). The Northmen discovered the coast, as is now generally conceded, as early as 990, visiting it occasionally until the middle of the 14th c., but founded no settlement upon it. From 1350 to 1498, the time of Cabot's second expedition, there is no evidence that the coast was seen by any European. In 1524 it was visited by a French expedition, under Verrazano; in 1525 by the Spaniards, under Gomez, and, in 1527, by the English, under Rut; but none of these made any settlement. In 1556 a Roman Catholic priest, André Thevet, entered Penobscot bay, remaining five days, and holding numerous conferences with the natives, but without any immediate result. The first attempt to settle upon the territory was that of the French, under Du Mont, who in 1604 planted a colony on Neutral island in the river St. Croix, which was abandoned the following year. In 1605 capt. Weymouth explored a part of the coast, and was followed in 1607 by the expedition sent out by sir John Popham and sir Ferdinando Gorges, which, under a charter from king James, made a settlement at the mouth of the Kennebec. This colony, however, returned to England in the following year. In 1613 the French Jesuits established a mission on Mt. Desert island, but were soon driven off by the English. In 1616 Richard Vines, an agent of sir F. Gorges, went with a small company to Saco, to remain during the winter and explore the surrounding region; while a company of fishermen, under capt. John Smith, took possession of Monhegan island, ranged the whole coast to Cape Cod, and prepared a map of the country, to which he gave the name of New England. In 1620 James I. divided the territory conveyed by the charter of 1606, granting to the Plymouth company the portion lying between the 40th and 48th degrees of n. lat., and to the Virginia company the whole region s. of the 48th degree. In 1622 Gorges and capt. John Mason obtained from the Plymouth colony a grant of the territory lying between the Merrimac and the Kennebec rivers, and in 1623 planted a colony at the mouth of the Piscataqua, which was the first permanent settlement of the main land in Maine. Gorges and Mason divided these possessions between them, the former taking the portion e. of the Piscataqua, and the latter that w. of the same river. In 1624 Gorges established a colony at York, and in 1625 Pemaquid was occupied under grants from the Plymouth company. After 1630 settlements were made at Saco, Biddeford, Cape Elizabeth, Portland, and Scarborough, which flourished until 1675, when they, in common with those between the Kennebec and the Penobscot, were destroyed by the Indians. The whole country e. of the Penobscot was claimed by the French, and little improvement was made there until after the revolutionary war. In 1635 the

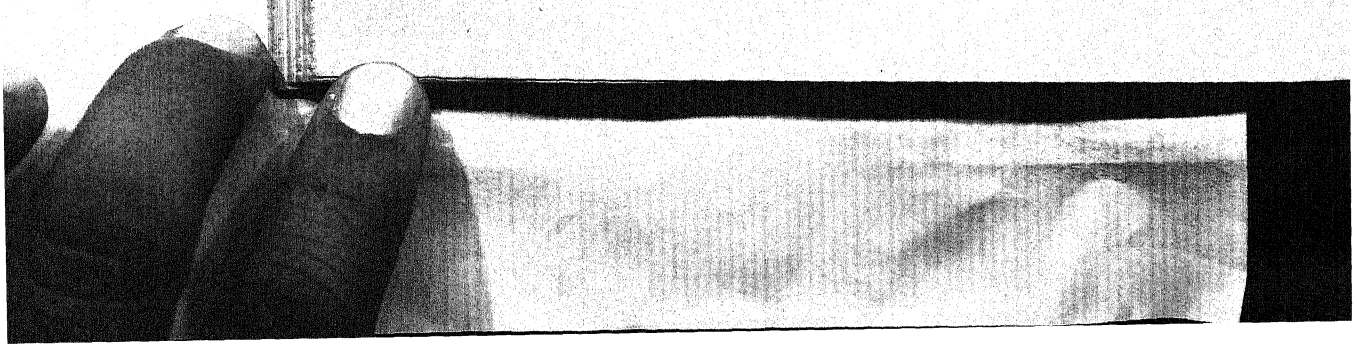
portion of the Plymouth company's territory lying between the Piscataqua and the Kennebec was assigned to Gorges, who, after 1639, established a government over it under the name of Maine, which continued till 1677, when the territory was sold to Massachusetts for the sum of £1250. King Philip's Indian war began in Maine shortly before this time, and was attended with all the horrors of a conflict with an uncivilized and deeply angered people. During the next eighty-five years the white settlers were in constant terror of Indian raids. In 1647 Gorges died, and in 1664 the territory between the Kennebec and the Penobscot was granted by Charles II. to his brother James (then duke of York, afterward James II.), who established a government at Pemaquid, where he erected a strong fort. This country, however, was surrendered to Massachusetts in 1686, and her title thereto and to all the territory e. to the St. Croix and Nova Scotia was confirmed by the provincial charter of 1691. Between 1687 and 1689, Andros, the royal governor of the New England colonies, visited Maine, and practiced great extortion upon the inhabitants. By the treaty of 1783, at the conclusion of the revolutionary war, Massachusetts obtained possession of the territory and exercised jurisdiction over it as "the district of Maine" (often known as "the province of Maine") until 1820, when it was admitted to the union as an independent state. Its population at that time was 298,269. The growth of the state was steady from that time forward, the census of 1870 showing a population of 626,915, of whom 313,103 were males, and 313,812 were females; number of families, 131,017; of dwellings, 121,953; of persons over 10 years of age who could not read, 13,486, and of those who could not write, 19,052. The number of persons engaged in all occupations was 208,225, of whom 82,011 were engaged in agriculture, and in professional and personal services, 36,092, including 890 clergymen, 558 lawyers, 818 physicians and surgeons, and 4,183 teachers.

The surface of the state is much diversified, the sea coast being in large part flat, and at some points marshy. The chief exceptions to this are Mt. Agamenticus, 670 ft. high, near the s.w. coast; the Camden hills, 1500 ft. high, on the Penobscot, and the numerous peaks of Mt. Desert island and its vicinity, some of which rise to a height of over 2,000 feet. Back from the coast the country is hilly or mountainous. The great Appalachian chain, of which the White mountains of New Hampshire are a part, originates in the British province of New Brunswick, enters Maine at Mars hill in lat. 46° 30', crosses the state in a s.w. direction, and joins the White mountain range at the New Hampshire line. The highest elevation of this range in Maine is Mt. Katahdin, near the geographical center of the state, which is 5,385 ft. in height. The other principal elevations are Mt. Abraham, Mt. Blue, Sugar Loaf, Chase's mountain, Mt. Mattatuck, Mt. Puzzle, and Mts. Saddleback and Bigelow. The Ebene and Spencer mountains, trending southward, and the highlands on the n., are spurs of this range. The n. portion of the state is drained by the Walloostook and the Aroostook, which empty into the St. John. The St. Croix forms a portion of the boundary between Maine and New Brunswick and empties into Passamaquoddy bay. The largest river of Maine is the Penobscot, which, with its branches and connecting lakes, drains the center of the state, flows into Penobscot bay, and is navigable for large vessels to Bangor, more than 50 m. from its mouth. West of the Penobscot is the Kennebec, navigable to Bath, and furnishing unlimited water power; and further w. still are the Androscoggin, the Saco, and the Piscataqua, which latter separates Maine from New Hampshire. One of the most striking natural features of the state is presented in the great number of lakes, both small and large, whose surplus waters go to swell the volume of the principal streams. These lakes, together with the rivers, are estimated to cover an area of 3,200 sq. miles. The largest is Moosehead, 35 m. long and from 4 to 12 in breadth. Among the others are the Sebago, Umbagog, Chesuncook, Baskahegan, Eagle, Portage, Long, Madewaska, Pamedumcook, Millinoket, Sebec and Schoodic. The soil in the valleys is generally fertile, but comparatively sterile in the mountains. The winters are long and severe, but of uniform temperature, the snow lying upon the ground from three to five months of the year. The thermometer ranges in the course of the year from 30° below to 100° above zero. The most unpleasant feature of the climate are the n.e. winds of the spring and early summer, usually accompanied by chilly fogs.

The state, especially in Aroostook, Piscataquis, and Washington counties, is well supplied with minerals. Iron, lead, tin, copper, zinc, and manganese are found in considerable quantities, while the manufacture of alum, copperas, and sulphur might easily be made profitable. Marble, slate, and limestone are abundant, while granite of the finest quality is obtained in blocks weighing more than 100 tons each. The metallic ores have not been much worked. The principal state quarries are in Piscataquis county.

The great forests which long covered the central and northern portions of the state are fast falling before the lumberman's axe, with the effect, as some believe, of a very serious diminution of the rain-fall. The principal forest trees are the pine, spruce, hemlock, maple, birch, beech, and ash, and in some parts of the state the butternut, poplar, elm, and sassafras. Apples, pears, and plums are raised with success; but the summer is too short for the growth of peaches.

The forests are inhabited by the moose, bear, deer, wolf, catamount, wolverine, beaver, sable, weasel, squirrel, etc., while among the birds may be mentioned eagles, wild geese and ducks, owls, hawks, partridges, pigeons, crows, quails, and humming-



birds. Trout, salmon, and pickerel are abundant in the lakes and rivers; while the waters off the coast abound with cod, mackerel, herring, halibut, etc.

The number of farms in 1870 was 59,804, containing 2,917,793 acres of improved and 2,920,265 acres of unimproved land. The cash value of these farms was $102,961,951; of farming implements and machinery, $4,809,113; wages annually paid, $2,903,292; total value of farm productions and improvements, $33,470,044; value of orchard products, $874,569; of produce of market gardens, $366,397; of forest products, $1,581,741; of home manufactures, $450,988; of animals slaughtered or sold for slaughter, $4,939,071; of all live stock, $23,357,129. The amount of wheat raised in 1870 was 278,793 bushels; of corn, 1,089,888 bushels; of oats, 2,351,354 bush.; of rye, 34,115 bush.; of barley, 658,816 bush.; of buckwheat, 466,635 bush.; of potatoes, 7,771,363 bush.; of wool, 1,774,168 lbs.; of hops, 296,850 lbs.; of butter, 11,636,482 lbs.; of cheese, 1,152,590 lbs.; of maple sugar, 160,805 lbs.; of honey, 155,640 lbs.; of milk sold, 1,374,091 gallons. Number of horses, 71,514; of milch cows, 139,259; of other cattle, 142,802; of sheep, 434,666; of swine, 45,760.

The production of lumber is the leading industry. In 1870 the forests were estimated to cover nearly one-half the entire surface of the state; but so extensive is the lumber trade, that this area of forest is constantly diminishing. Bangor, on the Penobscot, is the chief lumber mart. The amount surveyed there in 1870 was estimated at 200,000,000 feet. The counties which are the chief centers of the traffic are Penobscot, Washington, Hancock, and Piscataquis. In the first two of these counties the capital employed amounted to $3,500,000. The number of sawmills was 1,099, employing 8,500 men and $6,614,875 of capital, and dispensing in wages $2,449,132, while the products amounted to $11,395,747. The other chief industries are ship-building, boots and shoes, fisheries, ice-gathering, tanning and currying, vegetable canning, brick, cotton goods, flouring and gristmill products, lime, machinery, mining, and quarrying, paper manufacture, and woolen goods. In 1873 the whole number of manufacturing establishments was 6,072; number of persons employed, 55,614, of whom a little less than one-third were women and children; capital invested, $48,808,448; wages paid, $16,584,164; annual value of products, $96,209,136 The products of the Maine fisheries in 1870 amounted to $979,610. In 1873, 861 vessels of 46,196 tons were engaged in the cod and mackerel fisheries, affording employment for 2,000 men. Lobsters and clams are taken in immense quantities along the coast. The canning of vegetables, lobsters and clams is extensively carried on, the whole value of such products in 1875 being estimated at $1,842,000. The product of cotton goods in the same year amounted to $12,151,750.

The numerous harbors of Maine offer the best facilities for commerce. Several of these harbors are among the best on the whole Atlantic coast; that of Portland especially is easy of access, deep, large, and well protected, and is often unobstructed by ice when harbors farther west and south are frozen over. The ports of entry are Houlton, Eastport, Machias, Ellsworth, Castine, Bangor, Belfast, Waldoborough, Wiscasset, Bath, Portland, Falmouth, Saco, Kennebunk, and York. The imports from foreign countries in 1873–74 amounted to $3,628,425; amount of exports in the same year, $5,372,102. The chief articles of import were coal, fish, sugar, iron, molasses, and wool; while those of export were cotton goods, canned vegetables, etc., boots and shoes, lumber, bacon, hams, and lard. The whole number of vessels entering from foreign countries in the same year was 750, of 363,196 tons burthen; number of clearances, 1,489, of 512,287 tons; number of registered, enrolled and licensed vessels, 3,221, of 585,842 tons. In the coasting and fishery trade were entered at the same time 2,291 vessels of 1,124,127 tons, and cleared 1,526 of 847,178 tons. In 1873 there were built in the state 276 vessels of 89,817 tons.

In 1875 Maine had 945 m. of railroad, controlled by 19 different corporations. The most important of these roads are the Atlantic and St. Lawrence, European and North American, Maine Central, Portland and Kennebec, and the Portland, Saco, and Portsmouth. Lines of steamers ply regularly between the largest cities of the state and Boston; also between Portland and New York, St. John, N. B., and Halifax; and in the winter between Portland, Liverpool, and Glasgow.

In 1874 Maine had 64 national banks, with a capital of $9,840,000, and an outstanding circulation of $7,946,576. The number of savings banks was 58, with $31,051,963 of deposits. There were at the same time 120 insurance companies doing business in the state. The public indebtedness of the state in 1875, after deducting the sinking fund held for its payment, was $5,574,378. The cash value of real and personal property in the state in 1874 was estimated at $254,000,000.

The public institutions are the insane hospital at Augusta, the state prison at Thomaston, the reform school near Portland, the industrial school for girls in Hallowell, the orphan asylum in Bangor, the military and naval orphans' asylum at Bath, and the Maine general hospital at Portland. There are no state institutions for the care of the deaf and dumb or the blind, but the state arranges for their care in the institutions of other states.

The permanent school fund, derived from the sale of wild lands belonging to the state amounts to about $370,000. The revenue for the support of public schools is derived in part from this fund and in part from taxation. The cost of maintaining

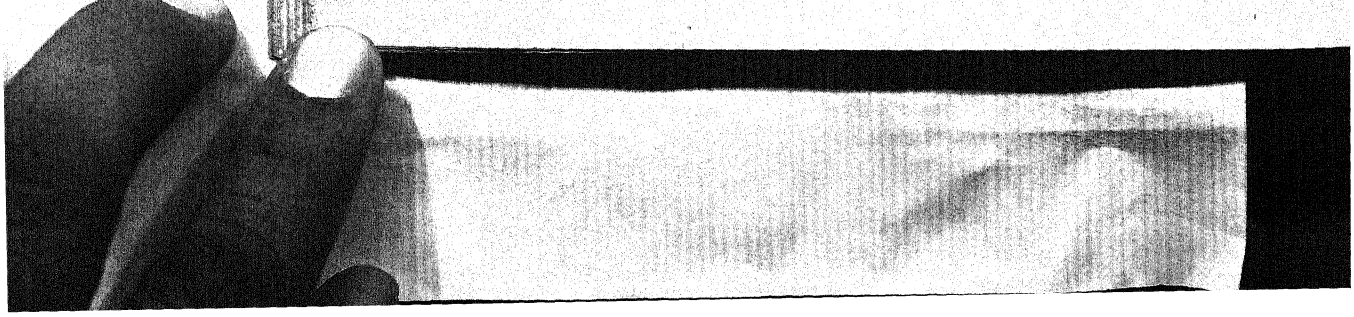
the schools in 1874 was $1,237,778, the sum being apportioned among the several towns according to the number of persons therein of school age. According to the latest reports, the number of persons in the state of school age was 225,219; registered in summer schools, 122,458, with an average attendance of 98,744; in winter schools, 132,333, with an average attendance of 108,478; number of school districts, 4,043; value of school property, $3,079,311; male teachers in summer, 161; in winter, 1,928; female teachers in summer, 4,366; in winter, 2,367; average wages of male teachers, per month, $36.17; of females, per week, $4.05. The legislature, several years since, established a system of free high-schools, the state defraying one-half the cost of instruction upon certain conditions. The system has worked well. The number of pupils enrolled in these schools in 1874 was 14,820; the amount paid by the state for their support, about $40,000. There are two normal schools, the western at Farmington, the eastern at Castine; tuition being free to those who agree to become teachers within the state. In 1873 the state appropriated $17,500 for the support of these schools. Maine has four colleges—Bowdoin college at Brunswick, founded in 1801; Colby university at Waterville (Baptist), founded in 1820; Bates college at Lewiston (Freewill Baptist), founded in 1863; and the state college of agriculture and the mechanic arts at Orono, founded in 1868, and receiving the avails of the public lands appropriated by congress for the purpose. The Congregationalists have a theological seminary, founded in 1820, at Bangor. There are also in the state several flourishing seminaries under the patronage of different religious sects. The number of libraries in the state in 1870 was 3,334, containing 984,510 volumes; of these, 1872, containing over 450,000 volumes, were private. The most important public libraries are the state library in Augusta, and those of Bowdoin college, the Portland institute, the Bangor theological seminary, the mechanics' association of Bangor, Colby university, and Bates college, respectively.

The number of newspapers and periodicals was 65, of which 7 were daily, 1 triweekly, 47 weekly, 1 semi-monthly, 8 monthly, and 1 quarterly. In 1874 the daily papers had increased to 9, the weeklies to 56. The religious organizations in 1870 numbered 1326, having 1102 edifices, and property valued at $5,196,853. The principal denominations were the Baptist, Congregational, Methodist, Freewill Baptist, Protestant Episcopal, Jewish, Christian, Roman Catholic, Second Advent, Unitarian, and Universalists. The legislature, composed of a senate of 31 members and a house of representatives of 151 members, elected on the 2d Monday of September, annually, meets at Augusta, the capital, on the first Wednesday in January. The governor (salary $2,500) is elected annually, and has the advice of a council of 7 members elected by the legislature on joint ballot. The supreme court, composed of 8 judges, is appointed by the governor and council for a term of 7 years, each judge receiving a salary of $3,000. The county of Cumberland, embracing the city of Portland, has a superior court of one judge, appointed in the same way. Probate judges are elected by the people of each county for terms of 4 years. Judges of inferior courts are appointed by the governor and council for terms of 7 years. The laws of Maine against the manufacture of and the traffic in intoxicating liquors are very strict, and supported by severe penalties. Liquors for medicinal, mechanical, and manufacturing purposes are sold in the several towns and cities by state agents appointed for the purpose. Husbands are not liable for debts contracted by their wives in their own name, but the latter may be sued for them. A wife may hold real and personal estate separately from her husband, and may convey or devise the same by will.

The electoral votes of Maine for president and vice-president of the United States have been as follows: 1820, 9 for Monroe and Tompkins; 1824, 9 for Adams and Calhoun; 1828, 1 for Jackson and 8 for Adams for president, and 1 for Calhoun and 8 for Rush for vice-president; 1832, 10 for Jackson and Van Buren; 1836, 10 for Van Buren and R. M. Johnson; 1840, 10 for Harrison and Tyler; 1844, 9 for Polk and Dallas; 1848, 9 for Cass and Butler; 1852, 8 for Pierce and King; 1856, 8 for Fremont and Dayton; 1860, 8 for Lincoln and Hamlin; 1864, 7 for Lincoln and Johnson; 1868, 7 for Grant and Colfax; 1872, 7 for Grant and Wilson; 1876, 7 for Hayes and Wheeler; 1880, 7 for Garfield and Arthur.

MAINE, one of the ancient provinces of France, immediately s. of Normandy, corresponds to the modern departments of Sarthe and Mayenne. Its chief town was Le Mans, now the capital of the department of Sarthe.

MAINE, Sir HENRY JAMES SUMNER, LL.D., b. England, 1822; educated at Pembroke college, Cambridge, and afterwards a tutor in Trinity college. In 1847 he was appointed regius professor of civil law in the university, but resigned in 1854 to become reader on jurisprudence at the middle temple. From 1862 to 1869 he resided in India as law member of the supreme government. This office he filled with high distinction, introducing many important legislative reforms. On his return to England he was elected professor of jurisprudence at Oxford, and the next year he was made a member of the council of the secretary of state for India, and was knighted. In 1875 he published as a pamphlet a lecture delivered at Cambridge on *The Effects of Observation of India on Modern European Thought.* In 1877 he was elected master of Trinity hall, and in 1878 resigned his professorship. Sir Henry published in the *Cambridge Essays* in 1856, *Roman Law and Legal Education;* but his other works are devoted to subjects upon which he is



of the highest authority, the origin and development of institutions, the condition of primitive society, and the growth of law and legal conceptions. His *Ancient Law* appeared in 1861; his *Village Communities* in 1871; *Lectures on the Early History of Institutions* in 1875; and *Modern Theories of Succession to Property* in 1878.

MAINE DE BIRAN, FRANÇOIS PIERRE GONTHIER, 1766–1824; b. France; was attached to the body-guard of Louis XVI., and in the latter part of 1789 was involved in some of the disturbances in Paris, but was not concerned in the revolution which followed. Under the first empire he was appointed to a sub-prefecture, and was a member of the legislature. He opposed the policy of Napoleon during the latter part of his reign, and became a legitimist with the advent of the restoration. He was made a deputy and a councilor of state, retaining his seat in the legislature from 1818. He wrote much in a philosophical vein, contesting the opinions of Condillac, and developing a system of his own which achieved a considerable reputation. M. Cousin edited an edition of his works which was published in Paris, 1841, in 4 vols.; and an account of his life and opinions appeared in 1857, written by Naville.

MAINE-ET-LOIRE, an inland department of France, forming a portion of the lower basin of the Loire, is bounded on the w. by the department of Loire-Inférieure, and on the e. by that of Indre-et-Loire. Area, 2,745 English sq. miles. Of which about 1,087,634 acres are arable, 197,748 in meadow, and 95,435 in vineyards. Pop. '72, 518,477. The surface is gently undulating. The soil is fertile, producing the usual crops, white and green, and a variety of excellent fruits. Wines, red and white, the latter comprising several highly esteemed varieties, are extensively cultivated; 11,000,000 gallons are made annually. Iron and coal mines are worked; and there are numerous mills and factories for the production of cotton, woolen, and linen goods. The department is divided into the five arrondissements of Angers, Baugé, Segré, Cholet (formerly Beaupréau), and Saumur. Capital, Angers.

MAINE LIQUOR LAW. See TEMPERANCE, *ante*.

MAI'NOTES, the inhabitants of the mountainous district of Maina, a peninsula between the bays of Kolokythia and Koron, forming part of the province of Laconia, in Greece. They have been regarded as the descendants of the ancient Spartans, whose land they now occupy; but more probably they are of Slavonic origin. They number about 60,000, and are a wild and brave race, but superstitious, and addicted to robbery. While the Turks held possession of Greece, the Mainotes were almost completely independent; and when not engaged in a common struggle against the Turks, their chiefs were at war with each other. The Mainotes, under their principal chief or bey, took a prominent part in the war for the liberation of Greece; but after the death of Mavromikalis, their last bey, their independence was destroyed.

MAINPRIZE, in English law, was a term denoting a security by which the bailer or mainpernor took the party bailed under his own personal charge or friendly custody, giving security to produce him at the time appointed. The practice is now obsolete, and superseded by bail (q.v.).

MAIN'TENANCE is a law term commonly used to denote an illegal succoring of a person, as by lending money to a stranger in carrying on law suits. Contracts are sometimes held to be illegal on this ground.

MAINTENANCE (*ante*), in law, an intermeddling by a person in a suit in which he is not concerned, as by giving money to another to carry on such suit, by hiring counsel for him, or assisting him in any unauthorized way. But persons between whom a certain relationship, or a certain relation created by law, exists, may give assistance to each other in suits in which they have respectively no interest. Thus, a husband may assist his wife, or a landlord his tenant. A lawyer may give professional assistance to a party in such suit, but he is not justified in giving pecuniary aid. The old common law rule in regard to the prohibition of maintenance has been greatly relaxed; and aid of the party to a suit is not now generally illegal. For instance, an agreement between a lawyer and his client to share the sum recovered in a particular suit is good, as a rule, in this country, though strictly prohibited by the older law. See CHAMPERTY.

MAINTENANCE, CAP OF, sometimes called *cap of dignity*, a cap of crimson velvet lined with ermine, with two points turned to the back, originally only worn by dukes, but afterwards assigned to various families of distinction. Those families who are entitled to a cap of maintenance place their crests on it instead of on a wreath. According to sir John Fearne, the wearing of the cap had a beginning from the duke or general of an army, who, having gotten victory, caused the chiefest of the subdued enemies whom he led to follow him in his triumph, bearing his hat or cap after him in token of subjection and captivity. Most of the reigning dukes of Germany, and various families belonging to the peerage both of England and of Scotland, bear their crests on a cap of maintenance.

MAINTENON, FRANÇOISE D'AUBIGNÉ, Marquise De, was the daughter of Constant d'Aubigné and of Jeanne de Cardillac, and granddaughter of Théodore Agrippa d'Aubigné, well-known for his writings, his attachment to Protestantism, and his energetic character. Françoise was born Nov. 27, 1635, in the prison at Niort, where her

father was then imprisoned. On obtaining his release, he went (1639) with his wife and daughter to Martinique in the West Indies, where he died in 1645. After her father's death, Françoise returned, with her mother, to France; and her mother also dying, her father's sisters took her under their care, and educated her in a convent, where her conversion to the Roman Catholic religion was accomplished at the age of about 14 years—after an obstinate resistance, in which the brave little child, to use her own words, *fateguait les prêtres la Bible à la main*. It is singular to reflect what a zealot she afterwards became. When she was 16, she became acquainted with the poet Scarron (q.v.), who, struck by her beauty, intelligence, and helpless condition, offered her his hand, or, if she should prefer it, a sum of money sufficient for her entrance into a nunnery. Although Scarron was lame and deformed, she chose to marry him, and now lived in the midst of the refined and intellectual society which frequented the house of the poet. On his death, in 1660, she was reduced to great poverty, and proposed to go as a governess to Portugal, when Madame de Montespan (q.v.) obtained her a pension from the king. Four years afterwards, she was intrusted with the education of the two sons whom Madame de Montespan had borne to Louis XIV., and in this capacity displayed a patient tenderness and sleepless care that no mother could have surpassed; and now becoming acquainted with the king, soon fascinated him, so that he bestowed on her 100,000 livres, with which she bought the estate of Maintenon; and at last she succeeded in supplanting Madame de Montespan. It is difficult to describe her relation to the king. She was not, it is believed, his *mistress* in the ordinary sense of the term, but from that time to the end of his life, she exercised an extraordinary ascendency over him. She had a passion for being thought "a mother of the church;" but while she confessed the strength of her desire to Romanize the Huguenots, she earnestly denied that she approved of the detestable *dragonnades*. In 1684, about 18 months after the death of the queen, Louis privately married her. She was much disliked by the people, but the courtiers sought her favor, and her creatures were made ministers and generals. In the midst of splendor, and in the possession of great power, she was confessedly very unhappy. She carefully brought up the children of Madame de Montespan; and it was at her instigation that Louis attempted to legitimize them. When he died in 1715, she retired to the former abbey of St. Cyr, which, at her wish, had been changed 30 years before, into a convent for young ladies. Here she died, April 15, 1719. She received to the end of her life, the honors of a king's widow. Her pretended memoirs are spurious, but her *Lettres* (9 vols. Amst. 1756, etc.) are genuine. By far the best edition is that published by M. Lavallée (1854 et seq.), entitled *Œuvres de Mme. de Maintenon publiées pour la première fois d'après les Manuscrits et Copies authentiques, avec un Commentaire et des Notes.*

MAINZ (MAYENCE, ancient *Moguntiacum*), the most strongly fortified city in the German empire, is situated in 50° n. lat., and 8° 10′ e. long., in one of the most fertile of the wine-bearing districts of Germany, having for its site a gentle slope on the left bank of the Rhine, near the junction of the Main. The pop. was in 1871, 53,918, including the garrison: in '75, 57,847. A floating bridge, resting on 49 pontoons, connects Mainz with the Rhenish village of Castel; as also a handsome railway bridge of iron, finished in 1864. The fortifications, which extend a length of nearly 10 m., consist of 14 principal and numerous lesser bastions, in addition to the four forts of Castel, Mars, Montebello, and Petersaue. In accordance with a decree of the congress of Vienna, Mainz was surrendered to the grand duchy of Hesse-Darmstadt in 1814, on condition that it was to constitute a German federal stronghold, and be garrisoned in common by Austrian, Prussian, and Hessian troops. In 1866, it became a Prussian fortress, and Prussia obtained all the rights that had hitherto belonged to the German confederation. By the treaty concluded at Versailles Nov. 15, 1870, the fortress of Mainz was declared an imperial fortress. Mainz which is one of the most ancient cities of Germany, retains many evidences of mediæval taste, and consists principally of narrow crooked streets; but of late years a new town has sprung up on the site of the ancient Roman city, and numerous sanitary improvements have been effected under the joint direction of the grand-ducal and civic authorities. Mainz has one Protestant and 10 Catholic churches, among the latter of which the most noteworthy are that of St. Ignacius, with its beautifully painted roof, and the cathedral, a memorable building, which was begun in 978, and after having been six times destroyed by fire, or through war, was restored by Napoleon. It has one great tower, 400 ft. in height, and 6 lesser towers, 14 altars, and 20 minor chaples. Mainz possesses numerous Roman remains, the most remarkable of which are the *Eichelstein*—a mass of stones supposed to be a memorial erected in honor of Drusus—and the ruins of a vast aqueduct at Zalbach. Mainz has a gymnasium, a seminary for priests, a normal school, a picture-gallery, museums, and a public library containing about 100,000 volumes. Among the industrial products of Mainz, which include artificial pearls, isinglass, tobacco, vinegar, soap, carriages, musical instruments, furniture, and articles in leather, the first and the last have acquired special reputation. Mainz from its position, necessarily enjoys a very important transit-trade, both by railway and river steam-navigation; and since the abrogation of many onerous restrictions, it has become one of the great internal ports for the corn and wine trade. The history of Mainz connects it with Rome from the year 13 B.C., when Drusus built on its site the

castle of *Maguntiacum;* but it owes its real importance to Charlemagne. It has acquired celebrity as the birthplace of Gutenberg (q.v.). In the 13th c. Mainz was head of the confederacy of Rhine cities: in 1468 the city was added to the domains of the archbishops of Mainz, who as such had precedence amongst the spiritual prince-electors of the empire. Mainz was several times in the possession of France, notably in 1801—1814.

MAI'PURES, or MAYPURES, the generic name of a number of Indian tribes of South America who live mostly on the Orinoco and Negro rivers. The best known tribe is the Moxos, who were conquered by the ancient Peruvians and were further advanced in civilization than the others, most of whom were cannibals. Many of the Moxos were converted to Christianity at an early date. A grammar and vocabulary of their language was written by father Pedro Marban in 1701.

MAISONNEUVE, JULES GERMAIN FRANÇOIS, b. Nantes, France, 1810. A distinguished physician and author of medical works; commenced practice in Paris in 1830; in 1835 opened a school for operative practice; and in 1840 became one of the surgeons of the hospitals and member of the society of surgeons. He has since been surgeon of the hospitals of *Cochin de la Pitié*, and in 1875 surgeon of the *Hotel-Dieu*. He ranks at the head of the brilliant school of modern surgery in France. His operations, inventions and improvements in surgical instruments have been remarkable. Though his courses in the hospitals are the most prized instructions in surgery, he has the disadvantage of being deficient in the use of language orally, though remarkably clear and concise in writing. His works are numerous, and of the highest authority of their date.

MAISONNEUVE, PAUL DE CHOMEDEY, Sieur de, b. in Champagne, France, early in the 17th c.; d. in Paris, 1676. In 1641 he led a colony of religionists to Canada and left them in Quebec; was himself made governor of Montreal, and founded that city in 1642, though the point had been named by Jacques Cartier seven years before. His administration was marked by energy and ability, and the good-will of the Indians. He resigned in 1669 and returned to France.

MAISTRE, JOSEPH DE, Comte, was b. 1753, in Chambéry, of a noble French family, which had settled in Savoy. While Savoy was occupied in 1792 by the French, Maistre, who was a member of the senate, withdrew from the country; and when the king of Sardinia, in 1799, was compelled to retreat to the island of Sardinia, Maistre accompanied his court, and in 1803 was sent as ambassador to St. Petersburg. In this post he remained until 1817, when he was recalled to occupy a place in the home government, and continued to reside in Turin till his death, Feb. 25, 1821. Maistre was an ardent advocate of legitimacy, and in his later career became one of the most eminent writers of the new (or liberal) conservative school in politics and religion, of which Chateaubriand may be regarded as the head. He had obtained some reputation as a writer at a very early period. His first work of note, *Considérations sur la France*, appeared in 1796. His later works were written either at St. Petersburg or after his return to Turin. They are: *Essai sur le Principe Générateur des Constitutions Politiques* (St. Petersburg, 1810); *Du Pape* (Lyons, 1821); *De l'Eglise Gallicane* (Paris, 1821–22); *Soirées de St. Petersbourg* (2 vols. 1822); and a posthumous work, *Examen de la Philosophie de Bacon* (Paris, 1836).

MAISTRE, XAVIER, Comte de, 1764–1862; b. in Chambéry, Savoy. When Savoy was conquered by the French during the first revolution, Maistre entered the Russian service and remained in it. During a visit to Italy in 1794 he was occupied with work in water-color and India ink drawings, and began in a desultory way the composition, entitled *Voyage autour de ma Chambre*, which has taken a place among the classics of French light literature. In 1811 his work entitled *Le Lépreux de la Cité de l'Aosta* exhibited his genius and his sympathy with real misery. *Prissoniers de Caucase* and *Prascovie, ou la Jeune Siberienne*, were translated and published in Philadelphia in 1826. The *Expedition nocturne autour de ma Chambre*, published 1825, was his last work. An edition of his works in three volumes appeared in Paris in 1823. He d. at St. Petersburg.

MAITLAND, a t. of New South Wales, in the co. of Northumberland, on the Hunter river, 95 m. n. of Sydney, and 20 m. n.w. of Newcastle, to which it is joined by railway. It is divided by the river into East and West Maitland. Pop. of Maitland, '61, 7,528; '71, 13,642. In either division are handsome banks, churches, and other public buildings. In West Maitland (much the more populous part of Maitland) are several coach-building factories, tobacco manufactories, and three mills (including a paper-mill). Good coal abounds in the neighborhood. The district has been called the "Granary of New South Wales."

MAITLAND, the name of a Scottish family, celebrated both in the literary and political history of their country. The first who acquired distinction was Sir RICHARD MAITLAND of Lethington, son of William Maitland of Lethington and Thirlstane, who fell at Flodden, and of Martha, daughter of George, Lord Seaton. He was born in 1496, studied at St. Andrews and in France, and on his return to Scotland was successively employed by James V., the regent Arran, and Mary of Lorraine. About 1551–52, he received the honor of knighthood, became a lord of the court of session in 1561 (before which, however, he had the misfortune to lose his sight), and lord privy seal in 1562. He died Mar. 20, 1586, at the age of 90. Maitland was one of the best men of his

time. In an age of violence, fanaticism, and perfidy, he was honorably conspicuous by his moderation, integrity, and anxiety for the establishment of law and order. He merits consideration not only as an eminent and upright lawyer, but as a poet, a poetical antiquary, and an historian. All his own verses were written after his 60th year, and show what things he had most deeply at heart. For the most part they consist of lamentations for the distracted state of his native country, the feuds of the nobles, the discontents of the common people, complaints "aganis the lang proces in the courts of justice," and the depredations "of the border robbers." A complete edition of Maitland's original poems was first published in 1830 (1 4to vol.) by the Maitland club, a society of literary antiquaries, taking its name from Sir Richard. His collection of early Scottish poetry was a work undertaken, if not completed, before his blindness attacked him. It consists of two MS. vols.; the first containing 176, and the second 96 pieces; they are now preserved in the Pepysian library, Magdalen college, Oxford. Maitland's principal historical performance is the *Historie and Cronicle of the Hous and Surename of Seytoun*, etc.

MAITLAND, WILLIAM, better known as "secretary Lethington," was the eldest son of sir Richard Maitland of Lethington, and was born about 1525. Like his father, he was educated both at St. Andrews and on the continent, and quickly displayed great aptitude for a political career. He became a convert to the reformed doctrines about 1555, but could not have been a very violent partisan, since in 1558 he was appointed secretary of state by Mary of Guise. In the following year, however, he openly joined the lords of the congregation, and was one of the Scotch commissioners who met the duke of Norfolk at Berwick, to arrange the conditions on which queen Elizabeth would give them assistance. In 1561, after the arrival of queen Mary from France, he was made an extraordinary lord of session. He strongly objected to the ratification of Knox's *Book of Discipline*, and in 1563 conducted the prosecution raised against Knox for treason: from this time he appears to have split with the reformers. In 1564 he held a long debate with Knox on the claims of the Reformed church to be independent of the state. In 1566 he took part in the conspiracy against Rizzio, after whose assassination he was proscribed, and obliged to seek shelter for some months in obscurity. He was, it is believed, cognizant of Bothwell's scheme for the murder of Darnley; yet, when he saw the hopeless nature of Bothwell's designs, he immediately joined the confederacy of the lords. While Mary was still a prisoner at Loch Leven, he is said to have written to her, offering his services, yet he was present at the coronation of king James VI., 1567; and although he secretly aided in the escape of the queen, he fought against her on the field of Langside. In 1568 he accompanied the regent Moray to the conferences held at York regarding the Scottish queen; but even here he tried to further her interests, and is said to have been the first to propose to the duke of Norfolk a union between him and Mary. The Scottish lords now felt that he was a dangerous enemy to the commonwealth, and in 1569 he was arrested at Stirling, but was liberated shortly after by an artifice of Kirkaldy of Grange. After the murder of the regent Moray, he and Kirkaldy became the soul of the queen's party, in consequence of which he was declared a rebel, deprived of his offices and lands by the regent Morton, and besieged, along with Kirkaldy, in Edinburgh castle. After a long resistance, the castle surrendered, and Maitland was imprisoned in Leith, where he died, "some," says Melville, "supposing he took a drink and died, as the auld Romans were wont to do." Buchanan has drawn his character with a severe pen in his Scottish tract entitled *The Chameleon*.

MAITLAND, JOHN, DUKE OF LAUDERDALE, grandson of John, first lord Thirlstane, brother of the famous secretary Lethington, and son of John, first earl of Lauderdale, and of Isabel, daughter of Alexander Seaton, earl of Dunfermline and chancellor of Scotland, was b. at the ancient family seat of Lethington, May 24, 1616. He received an excellent education, being skilled, according to bishop Burnet, in Latin, Greek, Hebrew, history, and divinity, was carefully trained in Presbyterian principles, and entered public life as a keen and even a fanatical Covenanter. In 1643 he attended the Westminster assembly of divines as an elder of the church of Scotland, and was a party to the surrender of Charles I. to the English army at Newcastle. Shortly after, however, he changed his politics altogether, and became a decided royalist. When Charles II. came to Scotland from Holland, Lauderdale accompanied him; but being taken prisoner at the battle of Worcester in 1651, was kept a prisoner for nine years. Set at liberty by gen. Monk, in 1660, he hastened to the Hague, and was warmly received by Charles. After the removal of Middleton in 1662, and of Rothes in 1667, Lauderdale was practically the sole ruler of Scotland, and for some time displayed a spirit of moderation, and an apparent regard for the religious feelings of his countrymen; but he soon became a bitter persecutor, sent multitudes of the Covenanters "to glorify God at the Grassmarket," and repelled in blasphemous language the remonstrances which many distinguished persons ventured to make. In 1672 Charles showed his appreciation of Lauderdale's conduct by creating him marquis of March and duke of Lauderdale; two years afterwards he was raised to the English peerage as viscount Petersham and earl of Guilford, and received a seat in the English privy counsel. He was one of the famous "cabal;" but having, by his domineering arrogance, excited the disgust and hatred of his colleagues, as well as of the nation, he fell into disgrace, was stripped of

all his offices and pensions in 1682, and died Aug. 24 of the same year. Lauderdale, according to Burnet, "was in his principles much against popery and arbitrary government," and his infamy consists in his shameless sacrifice of his convictions to his interests. He was a rude, blustering, passionate man, with what the duke of Buckingham called a "blundering understanding." Burnet has also given us a picture of his appearance. "He was very big, his hair red, hanging oddly about him. His tongue was too big for his mouth, which made him bedew all that he talked to; and his whole manner was very unfit for a court."

MAITLAND, SAMUEL ROFFEY, D.D., 1792–1866; b. London; studied at Trinity college, Cambridge, without graduation, as he was not a member of the church of England; studied law, and admitted to the bar at the Inner Temple in 1816; studied theology and was ordained in 1821; held perpetual curacy of Christ church, Gloucester, 1823–29. Resigning this he devoted himself to literature. In 1837 he was appointed librarian to Dr. Howley, archbishop of Canterbury, and keeper of the Lambeth MSS., retaining the office until the death of the archbishop in 1848. He edited for several years the *British Magazine*, in which he wrote valuable articles, chiefly on prophecy, church history, criticism, etc. His principal works are: *An Inquiry into the Grounds on which the Prophetic Period of Daniel and St. John has been supposed to consist of* 1260 *years; Letters on the Voluntary System; The Dark Ages, a Series of Essays intended to illustrate the state of Religion and Literature in the 9th, 10th, 11th, and 12th centuries; Essays on the Reformation in England; Eruvin, or Miscellaneous Essays on Subjects connected with the Nature, History, and Destiny of Man; An Essay on the Mystical Interpretation of Scripture; Strictures on Milner's Church History; Facts and Documents illustrative of the Doctrines and Rites of the ancient Albigenses and Waldenses; Sacred Art; Realism in Modern Art; Superstition and Science; Illustrations and Inquiries relating to Mesmerism.* He wrote also numerous pamphlets, letters, and reviews. He showed "great erudition, great power of reasoning, precision, and perspicuity of statement, and a style of masculine strength, simplicity, wit, and polish."

MAITREYA was, according to the Buddhists, a disciple of the Buddha Sâkyamuni and a Bodhisattwa, or a man of pre-eminent virtue and sanctity. He is classed in their mythology amongst the gods called tushitas, or "the happy," and has generally the epithet *ajita*, or "unconquered." The Buddhists believe that he will become incarnate as their future Buddha. In Thibetan he is called Jampa. A faithful representation of this Buddha, surrounded by the (Thibetan) goddesses Dolma, the Mantas or Buddhas of medicine, two ancient priests, and various saints, will be found in the atlas of Emil Schlagintweit's *Buddhism in Thibet* (London and Leipsic, 1863), where an interesting sketch is given (p. 207, ff.) of the characteristic types of Buddha images, and of the measurements of Buddha statues made by his brothers in India and Thibet.

MAIZE, *Zea*, a genus of grasses, having monœcious flowers; the male flowers forming a loose panicle at the top of the culm; the female flowers in axillary spikes, inclosed in large tough spathes, from which only the extremely long styles—in the common species 6 to 8 in. long—hang out like tufts of feathers or silken tassels. The grains are large, roundish, compressed, naked, and arranged in parallel rows along the upright axis of the spike. The COMMON MAIZE, or INDIAN CORN (*Z. mays*), is generally believed to be a native of the warmer parts of America, where it was cultivated by the aborigines before the discovery of America by Columbus. But a representation of the plant found in an ancient Chinese book in the royal library in Paris, and the alleged discovery of some grains of it in the cellars of ancient houses in Athens, have led some to suppose that it is a native also of the east, and has from a very early period been cultivated there, and even that it is the "corn" of Scripture; although on this supposition it is not easy to account for the subsequent neglect of it until after the discovery of America, since which the spread of its cultivation in the old world has taken place with a rapidity such as might be expected from its great productiveness and other valuable qualities. Columbus himself brought it to Spain about the year 1520. It is now in general cultivation in the s. of Europe, and supplies a principal part of the food of the inhabitants of many countries of Asia and Africa. It is by far the most productive of all the cereals; in the most favorable situations yielding an increase of 800 for one, whilst an increase of 350 or 400 for one is common where irrigation is practiced, and even without this the return is large. Maize succeeds well in tropical and sub-tropical climates; and, being a short-lived annual, is cultivated also where the heat of summer is intense and of sufficient duration, whatever may be the cold of winter. Thus, its cultivation extends to the northern parts of the United States, and is pretty common in Germany; although the want of sufficient summer heat renders it a very uncertain crop even in the southern parts of Britain. Some of the varieties of maize require about five months from the time of sowing for the ripening of their grains; whilst others, which, of course, are preferred in countries having a comparatively short summer, ripen in six weeks, or even less, but they are much less productive. The varieties are very numerous, of taller or humbler growth, from 3 to 10, or even 14 ft; with yellow, white, brownish-red, or purple, glass-like, somewhat translucent grains, which vary very much in size. The culm is stout and erect; the leaves from 1 foot to 2 ft. long, and 2 or 3 in. broad; the ears or *cobs* generally 2 or 3 in number, situ-

ated below the middle of the stem; in the large varieties, often above a foot long, and thicker than a man's wrist, in the smallest varieties, 4 or 5 in. in length. Maize succeeds best in light, rich, deep, and rather moist soils; and dislikes shady situations. It is very generally planted in little hillocks raised at intervals, and to each of which 5 or 6 seeds are allotted. North American settlers generally make it their first crop on newly cleared and very partially tilled ground. The grains of maize make a very palatable kind of groats, and afford an excellent meal for baking purposes. The meal is not, however, adapted for making bread without a mixture of wheat flour, or rye, owing to its deficiency in gluten; although in oily or fatty matter maize is richer than any other grain, and is very nutritious. Maize meal mixed with rye meal forms the common brown bread of New England. Maize very coarsely ground and boiled forms the *hominy* of the southern states of North America. The porridge made of maize meal is called *mush* in North America; and the entire grains are used under the name of *hulled corn* or *samp*. The unripe grains, slightly roasted, burst and turn inside out, assuming a very peculiar appearance; in this state, they are known as *pop-corn*; and in this state are a favorite article of food in America, and have recently become common in shops in Britain. The cobs of maize, ripe or unripe, are gathered with the hand. The unripe cobs are often pickled; they are also often boiled for the table. A kind of beer called called *chica* (q.v.) is made from maize, also a spirituous liquor, and vinegar. The starch of maize is a good substitute for arrow-root, and is now well known in Britain under various names, as *Oswego flour*, etc. The pith of the culm, before the flowers are produced, abounds in a sweet juice, which, extracted and boiled to a syrup, has of late been largely employed in the United States to furnish sugar; it is also fermented and distilled, and yields a good spirituous liquor. The small young stalks of thickly sown crops are cut over by the Mexicans, as an article for the dessert. In countries where maize does not ripen well, it is sometimes sown to afford food for poultry, or to be mown as green fodder for cattle. Where it is cultivated for its grain, the dried leaves are used as winter fodder. The tops, cut off after flowering are stored for the same use. The stalks are used for thatch and for fuel, and for making baskets. The fibers of the culm and leaves afford a durable kind of yarn; and the bracts or spathes which surround the ear are elastic, and can be applied to the stuffing of chairs, saddles, etc., and to the manufacture of good durable mattresses, which have become a profitable article of trade in Paris and Strasburg. The spathes are also much used for packing oranges and lemons; and in South America for making cigarettes. Good paper has been manufactured from them. There are few plants of which the uses are more various than maize, and few which are of greater importance to man. For separation of the grains of maize from the ears, a particular kind of thrashing-machine is used. Another species of maize, called CHILI MAIZE, or VALPARAISO CORN (*Z. curagua*), is distinguished by its serrated leaves. It is a smaller plant, a native of Chili, and has won a superstitious regard, because its grains when roasted split in the form of a cross.

MAJESTY, a title of honor now usually bestowed on sovereigns. Among the Romans *majestas* was used to signify the power and dignity of the people; and the senatorial, consular, or dictatorial majesty was spoken of, in consequence of these functionaries deriving their power from the people. After the overthrow of the republic, *majestas* became exclusively the attribute of the emperors, *dignitas* being thenceforth that of the magistrates. The *majestas* of the emperors of Rome was supposed to descend to those of Germany as their successors; but the adoption of the attribute by other European sovereigns is of comparatively late date. Its use began in England in the latter part of the reign of Henry VIII., up to which time "your grace" or "your highness" had been the appropriate mode of addressing the sovereign. Henry II. was the first king of France who was similarly styled, and Louis XI. and his successors became entitled, in virtue of a papal bull, to call themselves by the title of "most Christian majesty." Ferdinand and Isabella of Spain similarly obtained for themselves and their successors the title of "most Catholic majesty;" and Stephen, duke of Hungary, and Maria Theresa, of "apostolic majesty." The emperor of Austria is now styled his imperial royal majesty; in German, "K.K. (abbreviated for kaiserliche königliche) majestät." Emperors, kings, and queens are now generally addressed as "your majesty," not including the sultan of Turkey, whose proper style is "your highness." The sovereign of the United Kingdom is personally addressed as "your majesty;" and letters are addressed to "the king's" or "queen's" "most excellent majesty."

In heraldry, an eagle crowned and holding a scepter, is blazoned as an "eagle in his majesty."

MAJOLICA, a name at first given by the Italians to a certain kind of earthen-ware, because the first specimens that they saw came from Majorca; but as subsequently a large manufacture of the same kind of earthen-ware was carried on at Faenza, the name majolica was dropped, and "faience" substituted. The term majolica is now used to designate vessels made of colored clay, and coated with a white opaque varnish, so as to resemble "faience;" it is of much less value, and is very common in Italy.

MAJOR, a term in music, applicable to those intervals which are susceptible of being lowered a semitone without becoming false. See INTERVAL. Major is chiefly used as applied to the mode, key, or scale, which is said to be in the major when the third

above the key-note is a major third—that is, when it is distant from the key-note four semitones; thus, C C♯ D D♯ E

1 2 3 4

MAJOR, in the army, is the second field-officer in a battalion of infantry or regiment of cavalry. He ranks next to the lieut.col., and commands in his absence; is mounted; and is responsible, with the adjutant, that the men are properly drilled and equipped. The pay of a major ranges from £1 4s. 5d. a day in the household cavalry, to 16s. a day in the infantry of the line. There are no majors in the royal marines; and it was only in 1872 that, in the royal artillery and royal engineers, the first-captains were converted into majors to put their promotion more on a par with the line. In the artillery, the major commands a battery. Used adjectively, the word *major*, in the army, signifies a superior class in a certain rank, as sergeants-major, who are superior sergeants; except in the case of general officers, in which its signification is arbitrarily limited to maj.gen., the third of the four classes of generals.

MAJOR, GEORG, D.D., 1502–74; b. Nuremberg, Germany; studied theology under Luther and Melanchthon; was successively rector at Magdeburg in 1529; superintendent at Eisleben in 1536; professor of theology and court-preacher at Wittenberg in 1539; represented the Protestants in colloquy at Regensburg in 1546. When the Smalcald war broke out he left Wittenberg, and was appointed superintendent and court-preacher at Merseburg, but at the close of the war, the next year, he returned to Wittenberg. In 1552 he was made superintendent of Mansfeld churches. In 1551 he actively supported the doctrine of the Leipsic interim, that good works were necessary to salvation, in opposition to the strict Lutherans who denied that proposition. Amsdorf assailed him, declaring that good works were or might be detrimental to salvation. He was joined by the clergy of the district, and the count of Mansfeld being of the orthodox party. Major removed to Wittenberg. The doctrines advocated by Major were finally branded as heretical in the *Corpus Doctrinæ Prutenicum*, and were rejected by the compilers of the *Formula Concordiæ*. Towards the close of his life he became involved in the Crypto-Calvinistic controversy (q.v.). A portion of his works, comprising homilies and commentaries on the Gospels and Pauline epistles, was published in 1569 in 3 folio volumes.

MAJOR, RICHARD HENRY, b. in London, 1818; was made keeper of the maps and charts in the printed book department of the British museum, 1844; served as honorary secretary of the Hakluyt society from 1849 to 1858, editing therefore the *Select Letters of Christopher Columbus;* the *Historie of Travaile into Virginia Britannica*, and *Notes upon Russia*, from the Latin of Herberstein, and writing introductions to Mendoza's *History of China* and the earl of Ellesmere's *Tartar Conquerors of China*. At a later period he edited for the same society *India in the Fifteenth Century* and *Early Voyages of Terra Australis*. In 1861 he brought to light documents in the British museum showing the discovery of Australia by a Portuguese navigator in 1661, for which he was knighted by the king of Portugal. In 1868 he published the *Life of Prince Henry of Portugal, Surnamed the Navigator*—a work of great value. In later years he has been honorary secretary of the Royal geographical society and a frequent contributor to its *Journal*.

MAJORANI, GAËTANO. See CAFFARELLI, *ante*.

MAJOR'CA (Spanish, *Mallorca*), the largest of the Balearic isles (q.v.), lies 107 m. s.e. of the mouth of the Ebro, the nearest point of the Spanish coast, and 171 m. n. of Algiers. Its greatest length (from e. to w.) is 64 m., and its breadth (from n. to s.) 48 m., with an area of about 1386 English sq.miles. The n.e. half of the island is mountainous; the other parts are finely diversified with hills, valleys, and plains. The climate is healthful, the sea-breeze preserving a nearly equable temperature over the whole island. The inhabitants, who much resemble the Catalans in their appearance and manners, number above 200,000, are hospitable and industrious, and mostly employ themselves in agriculture. The chief products of the island are marble, slate, plaster, the common cereals and legumes, oranges, silk, lemons, oil, wine of excellent quality, olives and aromatic herbs. The chief town is Palma (q.v.), the capital. The Spanish government makes use of Majorca as a place of banishment for political offenders.

MAJORITY is the age at which a person in this country acquires a status of a person *sui juris*—i.e., is able to manage his or her own affairs. This age, in the United Kingdom is 21. Under that age, persons in England and Ireland are called infants, and are more or less subject to guardians, who manage for them their property. In Scotland, young persons are called minors between 12 (if females) or 14 (if males) and 21. It is chiefly with respect to the management of property that the distinction of majority is fixed upon, as it is assumed that persons under that age have not discretion and firmness to enter single-handed into contracts. It is also a common period fixed upon in wills at which to make provisions payable. As far as liability for crime is concerned, majority makes no difference, for all persons are capable of crime, when they have discretion enough to know that particular acts are criminal. A minor can, in Scotland, make a a will of movable estate, but cannot do so in England.

MAKÂLLAH, a seaport on the s. coast of Arabia, 300 m. e.n.e. of the port of Aden. It has a well-protected harbor, and is much frequented by vessels for the purpose of

laying in stores. It exports gum, hides, and senna, and is an extensive slave-market. Pop. about 4,500.

MAKART, HANS, b. Salzburg, 1840; studied art in Munich, following the school of Piloty; first became noted as an historical painter about 1868. He is a member of the Munich academy, and a professor of art in Vienna, where he has established his studio. His first great work was his "Catharine Cornaro," which was exhibited in the Austrian collection in Memorial hall, during the Centennial exhibition. It was sold for $12,500, and is now in the possession of the Berlin national gallery. His next most important work was the "Entrance of the Young Emperor Charles V. into Antwerp," which was exhibited in 1878, and attracted general attention. He also painted "The Gifts of Sea and Earth," two paintings of still-life, which were in the Centennial exhibition. Makart's work is characterized by a mastery in the use of color, warmth in the combinations effected, and startling contrasts; strongly reminding one of the Venetian school of Giorgione and Tintoretto. The *Portfolio* concluded some severely critical remarks on his "Catharine Cornaro" as follows: "There are few painters of the present day who have enough daring to handle such vast material, to dispose fearlessly and with proper relation so large a number of figures; and there are still fewer who possess the skill in execution which renders Herr Makart's picture a surprising and, in some sense, admirable performance." Another critic, writing for the same publication, says: "Herr Makart, by birth Austrian, but trained under Piloty, is imbued with the romance and voluptuousness of Venezia. He is, in fact, the Veronese of Vienna."

MAKI. See LEMUR, *ante*.

MAKIAN', one of the Moluccas (q.v.).

MAKO', a market-town of Hungary, on the right bank of the Maros, 16 m. e.s.e. of Szegedin. Pop. '70, 27,449, many of whom are Jews. The town contains numerous mills, and is famous for its breed of oxen, which are of unusually large size.

MAKRIZI, TAKI ADDIN ABU AHMAD MOHAMMAD, an eminent Arabic historian and geographer, was b. in 1360 A.D., in Makriz, near Baalbec. He early devoted himself to the study of history, jurisprudence, tradition, astrology, etc., at Cairo, where also he afterwards held the offices of mohtasib, or inspector of weights and measures, and of khatib and imam at different mosques. The most important of his numerous works are a *Topographical History of Egypt*, a *History of the Mamluk Sultans*, and two treatises on Moslem (Kufic) coins, weights, and measures, which have been edited and translated by Tychsen (into Latin), and by Silvestre de Sacy (into French). Makrizi also commenced a work *On the important Personages who had visited Egypt*, intended to fill 80 vols.; but only a small portion of these (one autograph volume is in the imperial library at Paris) was really accomplished. He died at the age of 82 years, in 1442 A.D.

MALABAR', a maratime district of British India, in the presidency of Madras, is bounded on the e. by the district of Coimbatore, while on the w. its shores are washed by the Arabian sea; and it extends in lat. from 10° 15′ to 12° 18′ north. Area, 6,002 sq.m.; pop. (July, '71) 2,261,250. The surface is occupied in the e. by the Neilgherries, and the western Ghauts cover a great portion of the district. The name of this district is applied to the whole south-western coast of southern India.

MALABAR (*ante*), a country lying on the western coast of India, and extending from cape Comorin to the river Chandragiri in 12° 30′ n. lat. The British province of Malabar is a portion of this tract between 10° and 13° n. lat., bounded n. by the province of Canara; s. by the territories of the rajah of Cochin; w. by the ocean, and e. by the chain of the western Ghauts. Between these and the sea Malabar lies, extending 200 m. along the coast, with an average breadth of 40 miles. The country may be divided into two parts, the first of which lies on the sea-coast about 3 m. wide, and consists of a poor sandy soil, covered with cocoanut trees. Near the termination of the low hills, which are offsets of the Ghauts, the soil is better, and is planted with rice. The sandy coast is remarkably intersected by inlets of the sea, which often run for great lengths parallel to the coast, receiving the various mountain streams, and communicating with the ocean by different narrow shallow openings. In other places the fresh water descending from the mountains into the low lands within the downs upon the sea-coast in the rainy season, totally overflows them as they have no outlet, and when the water is evaporated, these lands are cultivated and yield rich crops of rice. The second and most extensive portion of Malabar is in the vicinity of the Ghauts, and consists of low hills with narrow valleys between, which are rendered very fertile by the fine particles of mold washed down from the hills. The hills are low, their summits are level, dry and bare, presenting large surfaces of naked rock, with remarkably steep sides. These sides having the best soil are formed into terraces, and highly cultivated. The uplands are barren, and not much cultivated, and the inhabitants reside chiefly in the valleys and extensive ravines, upon the banks of the rivers and inlets. There are no large rivers, but innumerable small streams water the country. The climate though hot is generally healthful. The thermometer generally rises to about 90° in the shade, and seldom falls below 70°. The hot season is from February to May, and the wet from May to October. The low

country of Malabar and the whole region under the western Ghauts are excessively hot in February, and the vapors and exhalations are so thick that objects can with difficulty be distinguished at a distance of 5 miles. At the commencement of the western monsoon the rains fall very heavily both in the low country and on the mountains. These rains wash away the soil, leaving nothing but loose stones and sand on the hills. Forest trees abound, sometimes intermixed with corn-fields and plantations of fruit trees. The teak is produced in great abundance. Sandal wood not produced in Malabar, grows e. of the western Ghauts, and is exported from the ports of Malabar. Cocoanut trees abound. Black pepper is grown extensively, and is the chief export by Europeans who purchase about five-eighths of what is raised, and send it either directly to Europe, or to Bombay and China. The remainder is exported by native traders to the bay of Bengal, Surat, Scinde, and other places in n.w. India, and a portion is sent to the Arabian ports of Muscat, Mocha, and the British port of Aden. Ginger, betel-nuts, cardamoms, turmeric, and arrow-root are grown. Cardamoms grow on the face of the mountains in forest-lands. Within a few years the English have cultivated coffee on plantations situated on the slopes of mountains 2,000 ft. above sea-level. They obtain land either of the government or of natives, and not much capital being required, and the wages of native laborers being small, the profits are large. Rice is raised, but not enough for home consumption. Ginger is largely cultivated and exported to Europe. The animals are the elephant and bison in the forests, and some tigers, leopards, deer, bears, hogs, porcupines, monkeys, and squirrels. There is an animal of the ox species, called the *gayal*, found in the recesses of the mountains, 10 ft. high, with beautiful horns. There are but few horses. There is a small bullock used for tilling the ground and drawing vehicles, but not much in the transportation of goods, that being done by porters. Poultry has been introduced by Europeans, and common fowl now are abundant. Slavery existed in Malabar until a legislative act was passed in 1843 abolishing it throughout the British possessions. Malabar being intersected by many rivers, and inclosed by high mountains has been less disturbed than other parts of India by Mohammedan invasion, until in 1763 it was invaded and conquered by Hyder Ali. On this account the manners and customs of the Hindus here have been less changed than in other parts of India. The population consists of Hindus, Mohammedans, Christians, and some Jews. The Hindus constitute the great proportion. They are divided into the following castes: The Brahmins called Namburies are the highest, and another more numerous class of Brahmins called Puttars. The Nairs are the next, and then the Teers or Tiars who cultivate the land, and are freemen. Lastly the Patiars or Poliars, who were formerly slaves. The most remarkable caste is the Nairs who claim to be born soldiers, though they are of various ranks and professions. They are of 11 ranks, and form the militia of Malabar under the Brahmins and rajahs. They are very arrogant and formerly a Nair did not hesitate to strike down a cultivator or a fisherman who defiled him by touching his person, or a Patiar who did not turn aside when meeting him. The ancient Hindu state of property prevailing in Malabar, most of the land cultivated or uncultivated belongs to individuals, who have an absolute control of it.

The Brahmans, Nairs, and Tiars are well proportioned, handsome, and of olive complexion. The Mohammedans, called Moplays, are about one-fourth of the population, and are descendants of Hindu mothers and Arab fathers who settled in Malabar in the 7th or 8th century. The aboriginal natives generally live in separate houses, surrounded with gardens; but the villages are the work of foreigners, the houses being built of mud, neatly smoothed, and whitewashed or painted. The chief towns are Calicut, Tellichery, Cananore, and Ponany. Beypoor, 7 m. s. of Calicut, where Gama landed in 1498, is connected by a railway with Madras. The Portuguese then settled in Malabar, and the Dutch in 1663. The original name for Malabar in Sanskrit was Kevala. It is supposed that Malabar was very early conquered by a king from beyond the Ghauts, and that the Nairs were established there by the conqueror or brought in by the Brahmans as a military body to support the government; that in time they obtained settlements, and the chiefs became rajahs who governed the country like independent princes, until the invasion of Hyder Ali in 1763. He conquered and plundered the country, and expelled all the rajahs except those who submitted to him. In 1782 he appointed a deputy who made further progress in subduing and settling the country. In 1788 his son Tippoo proposed to the Hindus to accept the faith of the prophet, and began to levy large contributions on them, compelling many Brahmans, Nairs, and others to be circumcised. This produced a rebellion which his vigor soon suppressed. When the war broke out between Tippoo and the English in 1790, the rebellious rajahs and Nairs, who had fled from his persecution to the jungles, joined the British army, and Tippoo was driven from the country. In 1803 Malabar was incorporated in the Madras presidency. Christianity early made considerable progress in this part of India. The Nestorians established churches there in the 5th or 6th century. When the Portuguese landed in 1500 they found not only a Christian king, but a large body of professing Christians, and upwards of 100 churches. Buchanan at his visit in 1807 found 44 churches. The Romanists from Goa established themselves here in the beginning of the 16th century. The whole number of Christians on the Malabar coast, including the Nestorians or Syrians at the present time, is computed at 200,000. There are also about 30,000 Jews. The population in 1850 was 1,514,909. The country is tranquil and prosperous.

MALAB'ATHRUM, a name given by the ancient Greeks and Romans to aromatic leaves, which were in high repute among them, both as a medicine and a perfume, and with which they sometimes flavored wine. These leaves were brought from India, whence they were often called *Indian leaves;* and from the value in which they were held, sometimes simply *leaves*, just as the term bark is now used to designate the medicinal bark of the cinchonas. Many fabulous accounts were current of their origin. They are now pretty certainly known to be the same with the leaves sold in every Indian bazaar under the name of *tej-pat*, the produce of two nearly allied species of cinnamon (*cinnamomum tamala* and *c. albiflorum*), growing in the dense forests of the Himalayan valleys; and the name Malabathrum is regarded as a corruption of *tamalaputra*, tamala leaf. They are aromatic, fragrant, and gently stimulant.

MALAC'CA, a British maritime settlement on the s.w. coast of the Malay peninsula, extends in lat. from 2° to 3° n., and long. from 102° to 103° east. It is 40 m. in length, and, including the district of Naning, about 25 m. broad. Area, about 1000 sq.m.; pop. '71, 77,755. Near the coast, which is washed by the strait of Malacca, the surface is flat and swampy, producing rice. Inland, there are low hills, Mt. Ophir rising to 3,920 feet. Although little agriculture is carried on, and the greater portion of the country is still in the condition of jungle, the soil is fertile in rice, sago, pepper, fruits, vegetables, rattans, and timber. In the district of Naning are tin mines of some value. The climate is remarkably salubrious; the land and sea breezes are regular; and the thermometer ranges from 72° to 85°. The town and seaport of Malacca, capital of the district of the same name, is situated in lat. 20° 11′ n., long. 102° 16′ e., at the mouth of a small river which flows into the strait of Malacca. It is handsome and well built, and presents a fine appearance from the sea. Its most interesting building is the church of our Lady del Monte, the scene of the labors and supposed miracles of St. Francis Xavier, "the apostle of the east." Pop. variously estimated at from 5,000 to 15,000.

Malacca was taken by the Portuguese under Albuquerque in 1509; became a Dutch possession in 1642; fell in 1795 into the hands of the British to whom it was finally ceded in 1824. In 1867 Malacca, together with Singapore and the Prince of Wales island, were transferred from the control of the Indian government to that of the colonial secretary.

MALACCA, STRAIT OF, separates the Malay peninsula on the n.e. from the island of Sumatra on the s.w. Length, 520 m.; breadth varying from 25 m. at the s.e. to 200 m. at the n.w. extremity. In this strait are the British settlements of Singapore, Malacca, and Penang.

MAL'ACHI (probably an abbreviated form of *malachyah*, meaning "messenger of Jehovah;" the Seventy and the Vulgate have *malachias*), the name given to the last canonical book of the Old Testament. Regarding its author, nothing whatever is known. It has even been doubted whether Malachi is a proper name or only an appellative; the Seventy, the Chaldee, Jerome, and many modern scholars—Vitringa, Hengstenberg, Umbreit, etc.—favor the latter view. The period when the writer of Malachi composed his prophecies is conjectured to have been during the governorship of Nehemiah, or about 420 B.C. The book exhibits that strict regard for the proper observance of the ceremonial law, and that hatred of foreign marriages, etc., which marked the religious Jews after the return from exile, but has little of the old prophetic fire, freedom, and dramatic force

MALACHI, PROPHECY OF (*ante*), has a place in the canon of Scripture which has never been disputed and is explicitly confirmed by at least six quotations in the New Testament. I. As to the time when it was written. That Malachi was contemporary with the latter part of Nehemiah's administration is argued from the similar state of things mentioned in the prophecy and the history. 1. Malachi speaks of the governor of the Jews by the same name as that given to Nehemiah by the Persian king. 2. Malachi reproves the priests for having neglected, despised, and profaned the worship of God; and Nehemiah relates that, on his return a second time from Persia to Jerusalem, he found that a grandson of the high-priest had married a daughter of Sanballat, the notorious adversary of the Jews' religion; that the high-priest had established Tobiah the Ammonite in the precincts of the temple; that the priests and the Levites were defiled, their sacred covenant despised, and the Sabbath profaned. 3. Malachi charges the whole nation of the Jews with having robbed God by withholding the tithes and other appointed offerings; and Nehemiah relates that during his absence the portions of the Levites had not been given them, and that consequently they and the singers appointed to conduct the services had gone home to their fields. 4. Malachi denounces judgments on the nation for dealing treacherously with the wives of their youth and marrying strange wives; and Nehemiah relates that the Jews had married wives of Ashdod, of Ammon, and of Moab, and that their children spake half in the speech of Ashdod, having lost the knowledge of their fathers' language. II. These indications of the time when the prophecy was written explain also its contents, which are: 1. A declaration of God's love to Israel as proved by their history; 2. An address to the priests rebuking them for their heartless, mercenary, and corrupt services, threatening them with judgments if they persisted in their sins, and describing the character of a true priest in bright contrast with their own; 3. A rebuke of the people for their mar-

riages with the heathen and their rejection of the lawful wives of their youth, who were left to weep at the altars of God, the institutor of marriage at the beginning as a perpetual covenant; 4. An announcement of the sudden coming of the Lord, whom they claimed to seek, but who in an unexpected coming would sit in judgment against all transgressors, supplying by his own omniscience swift testimony against them; 5. A call to repentance, with the promise of abundant blessings to all who obey; 6. A testimony that there were some who feared God, and an assurance to them that they would always be precious in his sight; 7. A renewed announcement both of the appointed judgment and of the promised Savior, before whose great and dreadful day one in the spirit and power of Elijah the prophet would come calling fathers and children to repentance as the only way of avoiding the hastening doom.

MALACHITE, a mineral, essentially a carbonate of copper, of a green color, often found as an incrustation or stalactitic along with other ores of copper; often in large masses, and often also crystallized in rather oblique four-sided prisms, beveled on the extremities, or with the beveling planes truncated so as to form six-sided prisms. It is often of a fibrous structure. It is valuable as an ore of copper, although seldom smelted alone, not only because it is found along with other ores, but because the metal is apt to be carried off with the carbonic acid. It is sometimes passed off in jewelry as turquois, although easily distinguished by its color and much inferior hardness. It is used for many ornamental purposes; slabs of it—chiefly from the mines of Siberia—are made into tables, mantel-pieces, etc., of exquisite beauty. In 1835 a mass of solid malachite was found in the Ural mountains of more than 17 ft. in length, and weighing about 25 tons.

MALACHY, IMAR, Archbishop of Armagh, in Ireland, and a saint of the Roman Catholic church, is remarkable not only for his connection with a very important period of Irish church history, but also from the circumstance of his biography having been written by his distinguished contemporary, St. Bernard. Malachy was born, in the end of the 11th c., of a noble family, and having been educated by a hermit, named Imar, received orders at an early age from the hands of Celsus, archbishop of Armagh. His reputation for learning and sanctity was unexampled in that age, and Celsus had early designed Malachy as his successor in the see of Armagh; but Malachy protested against it, in consequence of an abuse similar to that of lay impropriation (q.v.), by which the temporalities of the see were held by laymen, called *coarbs.* In the end, however, he was elected, with the full rights of his see, and soon afterwards, in his capacity of primate, took measures for the reform of the many abuses which prevailed in all the churches of Ireland. He went to Rome during the pontificate of Innocent II., and having in vain sought permission to resign his see, and retire to Clairvaux, returned to Ireland invested with extraordinary powers as legate of the pope. In this capacity, he made a visitation of Ireland, and many of the controversies as to the ancient religious usages of the Irish church, which would be out of place in this publication, turn upon this period. Malachy again repaired to France in 1147, in order to meet the pope, Eugene III., during his visit to that country; but before his arrival, the pope had returned to Rome, and Malachy, during a visit to his friend, St. Bernard, at Clairvaux, was seized with an illness which ended in his death in the year 1148. A curious "prophecy concerning the future Roman pontiffs," is extant under the name of Malachy. It designates, by a few brief phrases, the leading characteristics of each successive reign, and in some instances these descriptive characteristics have proved so curiously appropriate as to lead to some discussion. The characteristic of Pio Nono, *Crux de Cruce* (cross after cross), was the subject of much speculation. That the prophecy really dates from the time of Malachy, no scholar now supposes; it was unknown not only to St. Bernard, but to all others, until the 16th century. It is first noticed in the end of that century, but it may be a sufficient indication of its worth to state that neither Baronius nor any of his continuators deemed it deserving of attention.

MALACOL'OGY (Gr. *malakos,* soft), a name now not unfrequently employed to designate that branch of natural history which has *mollusks* (called *malakia* by Aristotle) for its subject. Linnæus, and the naturalists who preceded him, devoted some attention to this study; but until the time of Cuvier the shells of the shell-bearing mollusks received a disproportionate share of attention, and the animals themselves were little regarded. Conchology (q.v.) has now, however, sunk to a very subordinate place, as a mere part of malacology, and this branch of science has been prosecuted during the present century by many eminent naturalists with great zeal and success. The names of Oken, Savigny, De Blainville, Van Beneden, Milne-Edwards, and Owen perhaps deserve to be particularly mentioned.

MALACOPTERY'GII, MALACOP'TERI (Gr. *malakos,* soft; and *pteryx,* a wing), or MALACOPTEROUS FISHES, one of the two primary divisions of osseous fishes in the system of Cuvier, distinguished by soft or spineless fins, the rays of which are jointed. Spiny rays are occasionally found in the first dorsal and the pectoral fins. Cuvier subdivided the malacopterygii into orders according to the position or absence of the ventral fins; *malacopterygii abdominales* having the ventral fins beneath the belly, as the salmon and herring; *malacoptery'gii sub-brachiati* having the ventral fins beneath the shoulder, as the cod and haddock; and *malacoptery'gii apodes* wanting ventral fins, as eels. Müller, however—followed in this by Owen and others—has separated from the malacopterygii an order of

fishes to which he has given the name of ANACANTHS (*anacanthini;* Gr. spineless), differing from acanthopterous fishes merely in the absence of spinous rays in the fins. Among the anacanths are the important families *gadidæ* (cod, etc.) and *pleuronectidæ* (flat-fish).

MALACOSTRACA (Gr. *malakos* soft, *ostraken,* shell), Aristotle's name for crustaceans. The malacostraca are now classified as a sub-class of crustacea, which comprises two divisions, *edriophthalmata,* and *podophthalmata.* In the first division the eyes are sessile, and the body not generally protected by a carapace. It comprises two orders, amphiopoda and isopoda. The eyes are generally compound, but are sometimes simple, and placed on the sides of the head, which is nearly always distinct from the body. The typical number of feet is seven pairs. The amphiopoda include the whale-louse (q.v.) and the sand-hopper (q.v.). A section of this order, *læmidopoda,* has been regarded as a distinct order, but the pretension has been withdrawn. In isopoda the respiratory organs are not thoracic as they are in amphiopoda, but are attached to the inferior surface of the abdomen. There are two eyes formed of a collection of simple eyes, or are sometimes really compound. The young isopod is developed within a larval membrane without appendages, which after a time bursts and sets free the young, which resemble the adult in most respects, but have only six pairs of limbs instead of seven. Like the amphiopoda, some are aquatic, and some terrestrial. Milne-Edwards divides the isopoda into three sections, 1, *natatory,* 2, *sedentary,* and 3, *cursorial.* In the first section some of the animals are parasitic, and some are not. In the second section they are all parasitic, generally within the gill chambers or upon the ventral surfaces of decapod crustaceans, as shrimps and others. The third section, the cursorial, includes the wood-louse (q.v.) and limnoria (q.v.). The second division of malacostraca, *podophthalmata,* have compound eyes, supported upon movable stalks, and a body completely protected by a carapace. There are two orders, stomapoda (q.v.) and decapoda (q.v.). see also INVERTEBRATE ANIMALS, LOBSTER, CRAB, and SHRIMP.

MALAGA, a modern maritime province of Spain, formed out of the ancient kingdom of Granada (q.v.), is bounded on the s. by the Mediterranean, on the e. by the province of Granada, and on the w. by that of Cadiz. Area, 2,786 sq.m.; pop. '70, 505,010.

MALAGA, a city and sea-port of Spain, capital of the modern province of the same name, is situated on the shore of the Mediterranean, 70 miles n.e. of Gibraltar. Sheltered on the n. and e. by mountains, and with a climate of which dryness and constant sunshine are the characteristics, this place is superior as a resort for invalids to any other either of France or Italy. Winter, in the English sense, is here almost unknown. Malaga is purely a place of commerce, and with the exception of some fine Moorish remains, it contains little that can be called artistic. The sea is here receding, and the Moorish dock-yard and quay are now in the town, while the beautiful *Alameda,* or public walk, was covered with water last century. Malaga is famous for its sweet Muscatel wines, grown on the heights in the vicinity, and the richest of which are called *las lagrimas.* The whole produce of the Malaga vineyards is estimated at from 35,000 to 40,000 pipes, of which about 27,000 pipes may be exported. The exports consist chiefly of wines, oil, figs, almonds, grapes, sugar, and raisins; and the imports of salt fish, iron manufactures, and colonial produce. Sugar is extensively manufactured for export, the production in 1872 being 21,960,000 pounds. Besides its legitimate trade and its manufactures of cloth, ropes, leather, soap, etc., Malaga carries on an extensive smuggling traffic with Gibraltar and Marseilles. Pop 110,000. Malaga, known to the Romans as *Malacca,* is a very ancient place. It was founded by the Phenicians, and has enjoyed a commercial existence and a measure of prosperity for 3,000 years.

MALAGUETTA PEPPER. See GRAINS OF PARADISE.

MALAKANS, a religious sect in the Russo-Greek church. The name in Russian is Molocani, i.e., milk-eaters, who contrary to the rule of the eastern church take milk on fast-days. The term Malakan is a term of reproach. They prefer to be called *Gospelmen.* A Prussian prisoner of war settled about the middle of the last century in a village of southern Russia, and spent his time visiting from house to house, and explaining the scriptures to the people. After his death they acknowledged him as the founder of their new belief. The Malakans receive the Bible as the word of God. They believe in the doctrine of the Trinity, the fall of Adam, the resurrection of Christ, receive the ten commandments, and forbid idolatry and the worship of saints. They consider the taking of an oath sinful, and enjoin a strict observance of the Lord's day. They firmly believe in the millennium. A member of their body, Terenti Beloreff, a fanatic, announced in 1833 that Christ would come in two and a half years. Many Malakans abandoned their callings, and awaited the event with fasting and prayer. Beloreff believed that he himself, like Elijah, would ascend to heaven on a certain day in a chariot of fire. Thousands of Malakans came from all parts of Russia to witness the miracle. He appeared seated in a chariot, ordered the multitude to prostrate themselves, and then, extending his arms as an eagle does its wings, he sprung into the air, fell on the heads of the gazing crowds, was seized and dragged to prison as an impostor. He died soon after, insanely declaring himself the prophet of God. But many of the Malakans still believe in his divine mission. Many of his followers afterwards emigrated to Georgia, in western Asia, and settled in sight of mount Ararat, expecting the millennium.

This sect spend whole days and nights in prayer, and have all things in common. They deny the sanctity and necessity of fasts, especially for men who have to work. They oppose popes and monks. Under the late emperor Nicholas they were severely persecuted, 16,000 men and women being seized by the police, arranged in gangs, and driven with rods and thongs across the steppes and mountains into the Caucasus. A great many fled across the Pruth into Turkey, where the sultan gave them a village called Tulcha for their residence. Dixon in his *Free Russia* has described this sect.

MALAKHOFF, or MALAKOFF. See SEBASTOPOL, *ante*.

MALAMOCCO. See VENICE, *ante*.

MALAN', CÉSAR HENRI ABRAHAM, D.D., 1787–1864; b. Switzerland; educated at the Geneva academy, and ordained to the ministry in 1810. He was at once appointed preacher to the cathedral, and a regent of the academy. The Calvinistic faith in Geneva had for some years been growing more and more rationalistic, and the presbytery of Geneva had issued an edition of the New Testament in which all passages in relation to the divinity of Christ were so changed as to bear a Socinian interpretation. Malan denounced the alterations, and took high evangelical ground; and the differences between him and the ecclesiastical authorities were so great that he left the established church in 1818. For a time he preached at his own house, but after 1820 he preached in an independent church of his own called La Chapelle du Temoignage. He was also active in many other directions. He founded a theological school at Geneva, and introduced Sunday schools into Switzerland. His followers were nicknamed MÔMIERS, which see. Malan published, among other books, *Les Môniers Sont-ils Invisibles*, 1828; *Les Chants de Sion*, 1826; *Le Témoignage de Dieu*, 1833; and *L'Eglise Romaine*, published in English at New York in 1844. He was a man whose zeal for truth, fervor of spirit, and active beneficence have left a lasting impress on his own land and through central Europe.

MALAN', SOLOMON CÆSAR, D.D., b. England, 1812; a son of Dr. César. He was educated at Oxford, and in 1838 went to Calcutta as professor of the classics in Bishop's college. While in India he was ordained deacon, and acted as secretary of the Asiatic society of Bengal. Soon after his return to England he was ordained priest, and made vicar of Broadwindsor in 1845, where he remained till 1871, when he became prebendary of Sarum. He has published many books, of which we may mention: *A Plain Exposition of the Apostles' Creed*, 1847; *A Systematic List of British Birds*, 1848; *Who is God in China?* 1855; *The Gospel According to St. John*, translated from the eleven oldest versions, 1862; *A Plea for the Authorized Version*, 1869; *The Liturgy of the Orthodox Armenian Church*, 1870; and *Original Documents of the Coptic Church*.

MALAPTERURUS (Gr. *malakos*, soft; *pteron*, a fin; and *oura*, the tail) is the name given to a genus of fishes of the family *siluridæ* (q.v.), in which in place of a true dorsal fin there is a soft fatty fin near the tail, and to this peculiarity the name is due. Two species are known, viz., *M. electricus* and *M. beninensis*. See ELECTRICITY, ANIMAL.

MÄLAREN, or MÄLAR, a large and beautiful lake of Sweden. It stretches westward from the Baltic, and lies between the laens of Westevas, Upsala, Nycöping, and Stockholm. A peculiarity of this lake is that it consists of several small lakes connected by short channels, which inclose islands to the number of 1300. Although its length is 78 m., and the average breadth 12, hardly a clear sheet of water a mile square through the whole extent can be found. It sends out many branches to the n. and s., which extend a good distance inland. One of them extending northward is 25 m. long. All of these arms and branches are navigable for boats. It is nearly on a level with the Baltic, and numerous steamers ply to and from Stockholm, which is at the eastern extremity, on both sides of the lake. The advantages of the navigation on lake Mälar have been increased by the Södertelge and Strömsholms canals. The former is 2 m. long, and opens a communication with the Baltic; the latter extends from the western end of the lake 50 m. into the interior, and leads to the region of the mines in the lake of Barken, which is 327 ft. above the sea-level. The scenery of the banks is exceedingly beautiful, and there are many villas and country-seats belonging to the residents of Stockholm.

MALARIA (MIASMA, *ante*), bad air. There are varieties of malaria, the most common or the longest known, or written about, being miasmatic malaria, or marsh miasm, which is regarded as producing the various forms of intermittent and remittent fevers, and, as many believe, yellow fever (see the articles under these titles). Since the more systematic and microscopical investigation of various diseases, it has been shown that many other diseases, some of which are contagious, are produced by poisoned, infected, or bad air—in other words, by malaria. Air impregnated or polluted by sewer gas is the malaria productive of putrid sore throat or putrid fever (diphtheria) (q.v.), and perhaps the origin of scarlet fever. A form of fever called typho-malarial appears to be caused by a mixture of putrid malaria and marsh miasm, although most authorities do not regard it as a distinct disease, but a mixture. It is thought by some that the term malaria should be restricted to marsh miasm, saying that air which is infected with the seeds of any disease, as, for instance, small-pox, might be called malaria, as well as that which produces diphtheria or putrid fever; but it is fairly conservative and proper to regard as malaria all air which is infected by the products of organic decomposition and

putrefaction, whether vegetable or animal, and which in their origin may be so traced, although after being generated they may be contagious.

MALATESTA, the name of an Italian family settled in the Romagna. The family is said to have been founded by a count Carpegna de' Billi, whose violence got him the name of *mala testa*, i. e. "bad head." Their principal branch was the ruling family of Rimini, of which Malatesta, count of Verrucchio, had possessed himself in 1295. He was an active Guelph partisan, as was his son and successor Malestino, who annexed Cesena in 1314. One of his brothers, Giovanni, was the husband of that Francesca, daughter of Guido da Polenta, and mistress of Giovanni's brother Paolo, whose pathetic story is found in Dante's *Inferno*. Malatestino's brother Pandolfo I. succeeded him, and continued the traditional policy of his family, in supporting the pope against the Ghibellines. Malatestino's son Ferrantino succeeded Pandolfo in 1326, but was driven out of Rimini by the pope in 1335; and Pandolfo's sons Malatesta and Galeotto were made joint lords of Rimini. They largely increased the power of the family, bringing under their rule part of Cervia, Fano, part of Fermo, Fossombrone, and Pesaro. Malatesta died in 1364, but Galeotto reigned till 1385, and was succeeded by his sons, Carlo and Pandolfo III. Carlo was a zealous supporter of pope Gregory XII., during the great schism, an opponent of the emperor Sigismund, and one of the ablest commanders of his time. Both he and Pandolfo III. held commands in the armies of the Visconti, dukes of Milan; and next to the Visconti the Malatesta family was at that time the most powerful in Italy. It was connected by marriage with the houses of Urbino and Montifeltro, and it had possession at one time of Bergamo and Brescia. Pandolfo III. died in 1421, and Carlo in 1427, without issue. Perhaps the most celebrated of the Malatesti is Sigismondo Pandolfo, who died in 1468. He was a patron of artists and authors, the founder of a library at Rimini, and a skillful general who fought for himself, for Venice, Naples, Sienna, Florence, and Aragon, and who made war upon the pope and was excommunicated in 1460. He was a son-in-law of Francesco Sforza. The last Maletesta who was lord of Rimini, was Pandolfo IV., driven out by Clement VII. in 1526, when Rimini was added to the dominions of the pope, of whom it had originally been held as a fief. The family was of German origin, and a member of it is mentioned in the early chronicles as being imperial vicar of Rimini under Otho III.

MALAY APPLE. See EUGENIA.

MALAY, INDIAN, or EASTERN ARCHIPELAGO, the largest and most important system of island groups in the world, stretching from 95° to 140° e. long., and 19° n. to 11° s. lat., is bounded n. by the China sea, e. by the Pacific, s. and w. by Australia and the Indian ocean. The principal groups are the Sunda islands, including Sumatra, Java, Bali, Sumbawa, Flores, the Sandalwood island, Rotti, Timor, etc.; the Philippines, in the n.; Celebes and the Saleyer islands, n. of Flores; the Moluccas, Key, Arru, Timor-Laut, and other groups, e. of Celebes. The chief islands for trade are Java, Sumatra, the Moluccas, and Borneo. The western or Dutch division of Papua, or New Guinea, is reckoned a part of the Malay Archipelago. The Philippines belong to Spain; Great Britain possesses Singapore, Penang, Malacca, and Labuan. Native rajahs rule over several of the islands, but the Dutch East Indies include the largest portion. The heat is tempered by sea-breezes, and water is abundant. Sugar, coffee, indigo, rice, and tea are largely produced in Java and Sumatra. Benzoin, gum-elastic, resin, pepper, rattans, cotton, drugs, ivory, dye-stuffs, edible nests, wax, tobacco, opium, and bêche-de-mer are also exported. Fine timber trees, including iron-wood, ebony, etc., are abundant, and the vegetation is most luxuriant. Birds of paradise, and a fine species of parrot, are found in Papua, the Arru, and Key islands.

MALAY PENINSULA, or Malacca. The name Malacca having by erroneous usage come to be applied to the British settlement on the s.w. portion of the peninsula rather than to the peninsula entire as it should be, we will describe it under the head by which it is also known, as the Malay peninsula. It is the most southerly part of the continent of Asia, extending from lat. 1° to 12° n., and between long. 98° and 104° e. of Greenwich. It is 775 m. in length n. and s., with an average width of about 100 m., and an area of 75,000 sq. miles. The gulf of Siam and the China sea wash its eastern shore, and the straits of Malacca and the Indian ocean its western.

A range of granite mountains extends northerly the whole length of the peninsula; its highest summits being in the southerly part, between lat. 6° and 7° n., which are 6,000 ft. above the sea. Innumerable rivers flow e. and w. from the mountains, forming bars at their mouths that render them of little value for navigation or harbors. The country between the mountains and the sea has considerable table-land, of fair fertility, and well timbered. But the timber is not of species possessing greatest commercial value. Ebony, sapan, eagle-wood, and the canes of commerce known as Malacca, are the principal. Dense jungles, the broken character of the surface, and occasional swamps, make the country difficult to explore. The Perak on the w., and Pahang, are the largest rivers. There is a small lake between the latter and the English settlement of Malacca. The products of the forests, besides those timbers already named, are caoutchouc, gutta-percha, cocoa-nuts, gums, spices, and resins. The products of the soil are rice, tobacco,

sugar-cane, coffee, cotton, bananas, yams, pine-apples, durians, and the mangosteen—the two latter large fruits. Tin mines have been worked in the mountains, but the mining is not prosecuted with increasing production; gold has been found in limited quantities.

The mean annual temperature near the sea is about 80°. There is no winter or rainy season, but rains fall frequently throughout the year, so that the climate is uniformly hot and moist, and subject to frequent fogs and heavy dews. The annual rainfall is about 100 inches. Where the land is swept by sea breezes the climate is healthful. The districts peculiarly subject to malarial disease of a virulent type are local, and are apt to be contiguous to fresh-water streams or marshes. The animals of the peninsula are numerous. There are eight species of the cat family, the largest the tiger and the leopard, both of large size, numerous, and dangerous. The Indian elephant is here indigenous, and two species of rhinoceros. The buffalo is a native, and is domesticated for riding and for draught. Besides the domestic ox there are two species of wild ox peculiar to the peninsula; a wild and a domestic goat; three species of deer; one small bear; ten species of monkey; and the ant-eater. The bats are the most peculiar of all the animals of the peninsula; one of them, the kalung, or vampire, being larger than a crow, flies high in great flocks, and is destructive of fruit. Sheep, hogs, and some varieties of foreign fowls have been introduced and acclimated. Of birds there are some of great beauty. The *marak*, or wild peacock, the double-spurred peacock, and several species of pheasant are the most remarkable for their plumage. Partridges, snipe, sun-birds, woodpeckers, wild cock, pigeons of numerous species and great variety of size, a brilliant variety of parrots, and kites and hawks abound. Of reptiles there are forty species of snakes, several of them poisonous, particularly the cobra; and the alligator, iguana, and lizards. Fish are abundant and among the finest flavored in the world. They constitute the main food of the people by the seaside. Shell-fish are rare, though shells not containing animals valued for food are large, beautiful, and numerous.

The population of the peninsula is estimated at 500,000, but this is little better than a guess. It is pretty near the geographical center of population of the Malay race, who occupy all its shores, though in the n. part, and especially away from the coast, the Siamese are numerous, and some negroes are found in the interior. The northern part of the peninsula is under the dominion of the king of Siam; the southern has mostly fallen under the sway of the British, whose colony of Malacca (see MALACCA) on the s.w. coast, and Singapore near the s. point, are the local centers of its power. The Dutch ceded the settlement of Malacca and Singapore to the English in 1824, in exchange for concessions in Sumatra and elsewhere. The Malays have been too long renowned for their daring as navigators, and their aggressive piracy, not to have won the consideration of all nations which have come to greatness through the same manifestations of barbarian vigor. Their cruelty and treachery are probably not greater than the cruelty and treachery of European peoples in the centuries succeeding the dark ages; and remembering that the vast and intricate coasts of the islands and countries occupied by the Malays invited all their enterprise to be expended in maritime excursions, and that a forbidding wilderness of jungles and wild beasts repelled enterprise inland, it may not be unfair to place them in the same category of bold rovers as the pirate Norsemen and Danes of our own English ancestry. As to the excessive treachery which has always been attributed to them it is hardly probable that so widespread an opinion is without good basis of fact. Yet those who have of late years had good means of studying their characteristics report that, under kind treatment and fair dealing, they are "transformed into an entirely different character, displaying gratitude, affection, fidelity, and higher sentiments of honor than are found among any other class of natives in India." The vigor and energy of the Malays as seamen and pirates have for centuries made them the terror of the more peaceful East Indians and Mongolians, as well as of the Europeans engaged in commerce with the east. A portion of the inhabitants of the coasts lived at sea rather than upon the land. Their boats, from 20 to 30 ft. in length, were arranged for cooking near the prow, their fishing and other conveniences in the middle, and the sleeping-room in the stern. Thus, with fish for their principal food and the fruits of the shores to be had for the seeking, roving became their daily life, and piracy the natural enterprise of the warlike—as it is of the warlike everywhere—by land or sea The more civilized of the natives are Mohammedans; the others are pagans of many shades. The former claim to be descended from Malays of Sumatra who migrated into or invaded the peninsula in the 11th or 12th c., and drove the former inhabitants into the mountains. Mohammedanism took root here in the 13th c., and Malacca was the capital for rulers who had embraced Mohammedanism from the year 1276. In the 15th c. the peninsula was an appanage of the king of Siam. In 1511 the Portuguese, under Albuquerque, overthrew the Malayan sultan, and asserted Portuguese dominion.

MALAYS (properly, MALAYUS, a Malay word, the derivation of which has not yet been satisfactorily ascertained) is the name given, in a restricted sense, to the inhabitants of the Malay peninsula, but in its wider acceptation, to a great branch of the human family, dwelling not only in the peninsula mentioned, but in the islands, large and small, of the Indian archipelago, in Madagascar, and in the numerous islands of the Pacific. In the fivefold division of mankind laid down by Blumenbach, the Malays are treated of as a distinct race, while in the threefold division of Latham they are

regarded as a branch of the Mongolidæ. Prichard has subdivided the various representatives of the Malay family into three branches, viz. (1), the Indo-Malayan, comprehending the Malays proper of Malacca, and the inhabitants of Sumatra, Java, Celebes, the Moluccas, and the Philippines, with whom, perhaps, may be associated the natives of the Caroline islands and the Ladrones; (2) the Polynesians; and (3) the Madecasses, or people of Madagascar. Accepting this subdivision, we shall, in the present article, confine ourselves to the Malays proper—the natives of Madagascar having been already noticed under that heading; and reserving the Polynesians generally and the Maoris in particular for distinct articles.

In physical appearance, the Malays are a brown-complexioned race, rather darker than the Chinese, but not so swarthy as the Hindus. They have long, black, shining, but coarse hair; little or no beard; a large mouth; eyes large and dark; nose generally short and flat; lips rather thicker than those of Europeans; and cheek-bones high. In stature the Indo-Malays are for the most part below the middle height, while the Polynesians generally exceed it. The Indo-Malays have also slight, well-formed limbs, and are particularly small about the wrists and ankles. "The profile," according to Dr. Pickering, "is usually more vertical than in the white race, but this may be owing in part to the mode of carriage, for the skull does not show a superior facial angle." Such is the general appearance of the Malays proper, or inhabitants of the peninsula and Indian islands. But these also have their subdivisions. There are the civilized Malays, who have a written language, and have made some progress in the arts of life; then there are the sea-people, *orang-laut*, literally, "men of the sea," a kind of sea-gypsies or robbers; and there are the *orang banua*, or *orang utan*, "wild men," or "savages," dwelling in the woods or forests, and supposed to be the aborigines of the peninsula and islands. "These three classes of Malays," says Crawfurd, "existed nearly three centuries and a half ago, when the Portuguese first arrived in the waters of the archipelago, just as they do at the present day. That people describes them as having existed also for two centuries and a half before that event, as, without doubt, they did in times far earlier." Still, while so widely differing in habits, all these speak essentially the same language. The Malays are essentially islanders, and have much of the daring and enterprise for which nations familiar with the sea are famous. Their original seat is by themselves stated to have been Menangkabo, in the island of Sumatra, rather than the peninsula itself. Even the Malays of Borneo claim to have had a Menangkabo origin. Palembang, however, also in Sumatra, has been mentioned as the original seat of Malay civilization; and others, again, point to Java as the source from which both Menangkabo and Palembang received their first settlers. "The Javanese," says Crawfurd, "would seem to have been even the founders of Malacca. Monuments, which prove the presence of this people in the country of the Malays, have even been discovered. Thus, sir Stamford Raffles, when he visited Menangkabo, found there inscriptions on stone in the ancient character of Java, such as are frequent in that island; and he was supported in his conclusion that they were so by the learned natives of Java who accompanied him in his journey. The settlement of the Javanese in several parts of Sumatra is indeed sufficiently attested. In Palembang they have been immemorially the ruling people; and although the Malay language be the popular one, the Javanese, in its peculiar written character, is still that of the court." The Malay language is simple and easy in its construction, harmonious in its pronunciation, and easily acquired by Europeans. It is the *lingua franca* of the eastern archipelago. Of its numerous dialects, the Javanese is the most refined, a superiority which it owes to the influence upon it of Sanskrit literature. Many Arabic words have also been incorporated with it, by means of which the Javanese are able to supply the deficiency of scientific terms in their own tongue. In religion the civilized Malays are Mohammedans, having embraced that faith in the 13th or 14th century. The tribes in the interior and the "men of the sea" have either no religion at all, or such as can be regarded only in the light of most debased superstition. The moral character of the Indo-Malays generally does not stand high; they are passionate, treacherous, and revengeful. Although good sailors, and able to amass wealth by legitimate commerce, they prefer piracy, and numerous have been the victims among European traders to Malay treachery and daring. Indeed, so little faith have Europeans in their professions or engagements, that they will never engage more than two or three of them in a ship's crew, for fear of unpleasant, if not disastrous, consequences.

MALAYS (*ante*) (Mal. *lajo*, Javan. *orang mœlayu*, traveling men, emigrants), a branch of the Mongoloid race which gives name to a large linguistic family, the Malayo-Polynesian. Stretching from Easter island to Madagascar, and from New Zealand to the Northern Sandwich islands, it covers about 13,000 by 5,000 miles. From the island of Hainan as a center, a curve may be described which will fall inside Borneo and cut across the Malay peninsula. If another circle be roughly drawn from Saigon as a center, including Formosa, the Philippines, Celebes, cutting Sandalwood island, and taking in the Sunda groups, including Java and Sumatra, the half-moon so formed shows the country of the true Malay race, and thence the allied dialects spread out like a fan toward Hawaii and New Zealand. This eastern area is cut across by the Papuans, or Australians and Melanesians, from New Zealand to the Ladrones, and from New Guinea to

the eastern Fijis. To the west of the Malay archipelago, southern Ceylon, the Maladirs, and the Seychelles show the probable line of settlement toward Madagascar. It seems at present undetermined how much or how little Malay blood be present in the brown islanders, Polynesians. Wallace, probably best informed of all, considers the Papuans and Polynesians as one in race. Peschel thinks the Australians Papuans of a debased type, and the Sandwich islanders half-blood Malays. Certainly the men of the Ladrones are half-breeds, and there is a distinct mixture of races all along the curve of contact, so that brown men, as in Papua, are mixed with true Papuans, and black Fijis speak a Polynesian dialect. The whole subject can be rightly understood only by a study of the very curious distribution of the fauna, and of the complicated ocean currents. Wallace, in separating these races, thus describes the Malay by contrast: "The Malay is of short stature, brown-skinned, straight-haired, beardless, and smooth-bodied. The Papuan is taller, black-skinned, frizzly-haired, bearded, and hairy-bodied. The former is broad-faced, has a small nose and flat eyebrows; the latter is long-faced, has a large and prominent nose, and projecting eyebrows. The Malay is bashful, cold, undemonstrative, and quiet; the Papuan is bold, impetuous, excitable, and noisy. The former is grave and seldom laughs; the latter is joyous and laughter-loving; the one conceals the emotions, the other displays them. It would seem that the Malays are a nation of emigrants, who have penetrated as far south-east as New Guinea, yet there seem no traces of an indigenous population. The small and barbarous black race, said to occur at various points within the Malay limit, may easily be explained as etiolated and roving Papuans, like the Australians, while the Alfuros and other supposed differing tribes are probably only brown types of half-breeds. The black races of India differ both in language and physique, notably in the hair. There are indications that the original home of the Mongoloid races, which stretch from Styria to east Greenland and from cape Horn to north Norway, may have been in some of the large islands of the Sunda group. The few Malay traditions locate a former seat of power at Menang Kaibo in Sumatra. How far Brahmanism penetrated, if at all, is doubtful, but Buddhism was introduced probably about the 5th c., and, about the end of the 13th, Islam. Nearly at that time they settled in the Malay peninsula, and started a strong government in Malacca, which was finally broken up by the Portuguese in the 16th century. To some 32,000,000 the relative religious proportions are now about as: Evangelical Christians, 7; Roman Catholics, 88; Mohammedans, 800; Buddhists, 60; Pagans, 45. Their language is the *lingua franca* of east Asia, and they penetrate everywhere as traders and pirates. Travelers differ as to their character, some representing them as gentle and polite, others as treacherous and quarrelsome; both views may not be far from the truth, the ruling races in the settlements being lazy and enervated, while many of the wild tribes are so uncivilized as to have been taken for different races. The Battaks are still partly cannibals.

The linguistic relations are thus tabulated:

MONGOLOID RACE.

MALAY-POLYNESIAN FAMILY.

- POLYNESIANS, Eastern Division,
  - *a.* North, — Hawaii.
  - *b.* North-east, — Marquesas.
  - *c.* East, — Tahiti.
  - *d.* Middle, — Rarotonga.
  - *e.* West, — Samoa. Tonga.
  - *f.* South-west, — Maori.
- MELANESIANS, Middle, — Fiji and some dozen neighboring dialects.
- MALAY-JAVANESE, Western,
  - 1. TAGALA, Islands,
    - *a.* North-east, — Ladrones.
    - *b.* North, — Formosa.
    - *c.* South, — Philippines.
    - *d.* West, — Malagassi.
  - 2. MULAYU-JAWI, Archipelago,
    - *a.* North, — Malay.
    - *b.* South-west, — Javanese.
    - *c.* South, — Sunda.
    - *d.* Many patois of the islands and of savage tribes, orang laoot, orang bajav, etc.

The Malay tongue (*bahasa jawi, mænjawikau,* to talk Malay) is probably a dialect of north Sumatra, of which Jawa is the old name. The old literary alphabet is the Kawi, probably formed from Pali, through either a Birmani or Siamese medium, about the 6th c., is neither crumpled like the one nor rounded like the other, but is easily recognized by its square and nearly identical letters. They are h, n, ch, r, k, d, t, s, w, l, p, d thick, dh, y, ny, m, g, b, t thick, ng, rl, lr. Vowel sounds: a, œ as in *but*, i, u as in *boot*, e as in *cane*, o, au as in *now*. Originally there were less than a dozen, with few or no aspirates or fricatives, but with the nasals. It is now written in a peculiar Arabic Neskhi, with 29 consonants and 8 vowel sounds. Other alphabets of the family are in Bugi, Manhkásar, Celebes, a new one self-evolved by the Battaks, and one in the Philippines which resembles most a true Indian. Malay literature is rich, but little original.

There is a romantic and mythological poem, founded as usual on the Mahabharata; plays and recitations like the Siamese; love songs and popular songs, simple and most

interesting of all; and tales from the Arabic and Sanskrit, including animal-myths, in which the jackal (Sans. *srigala*) plays the chief rôle. The Malay is not an isolated language, yet it has not now the usual flexibility of an agglutinating one, nor must the reader ever expect in such a tongue the idea of either time or regimen; the verbs appear under aspects, as in Russian, and the nouns in relation, as in Hebrew. Roots, supposedly one syllabled, are enlarged by affixes, strong consonants being precessed and the three nasals inserted or substituted whenever possible. Vowel change plays a great rôle, evolving, with precession, sometimes a dozen words. Interior contraction is the rule. Doubling is carried to its limit; either of the whole word with or without modification; with initial change; with a play upon similar syllables like Basque, or with insertion of a preposition. Prepositions are partly prefixed, partly suffixed, and it is not always easy to say whether they influence most, or exactly in what way, a noun or a verb, as in so-called Semitic participles. Much the same may be said of pronouns. On the whole, the language is easy, soft-sounding, with a nasal clang, and a great capacity for crude metaphor in plays upon words and expressions of complicated relations. Authorities: W. v. Humboldt, *Ueber d. Kawi-spr.* (1840, 3 vols.); Fr. Mueller, *Ueb. d. Ursp. d. Schrift d. mal. Voelker, Bul. W. Akad* (1865); Waitz, *Anthropol. d. Naturvoelker* (1869, 5 vols.); *The Races of Man*, Oscar Peschal (1876, 1 vol.); *The Malay Archipel.*, A. R. Wallace (1869, 2 vols.); *The Geog. Distrib. of Animals*, A. R. Wallace (1876, 2 vols.); *The Science of Language*, A. Horclacque (1877, 1 vol.).

MALBONE', EDWARD G.; 1777–1807; b. Newport, R. I.; at the age of 17 resided in Providence as a portrait-painter; removed in 1796 to Boston and pursued his profession with success; accompanied Washington Allston to Charleston in 1800, and sailed for Europe in 1801; met in London, Benjamin West, president of the royal society, who urged him to make that city his permanent residence; but he returned to Charleston. For several years he traveled extensively in the United States, and painted miniatures in the chief cities; visited the West Indies in 1806 for his health. His best picture is "The Hours;" the present, past, and future, being represented by three female figures.

MALCOLM, the name of four kings of Scotland. Malcolm MacDonald succeeded to the throne on the abdication of Constantine MacAodh in 944 A.D. The most important event of his reign was the cession of Cumbria, in 946, by the English monarch Edmund I. Malcolm was slain while engaged in quelling a revolt in the north of Scotland, in 953 A.D.

Malcolm MacKenneth, grandson of the preceding, ascended the throne in 1003. His life was passed chiefly in repelling the incursions of the Danes. He died in 1033. A collection of laws, the *Leges Malcolmi MacKenneth*, has been attributed to him, but is obviously a work of a later age.

Malcolm MacDuncan, surnamed CAN-MORE (Celtic, *Cean-more*, "Great Head"), was born about the year 1024, and ascended the throne on the death of Macbeth MacFinlegh, in Dec., 1056, or of Lulach MacGilcomgain, in April, 1057. For the first nine years of his reign, Malcolm was at liberty to devote his energies to the consolidation of his kingdom, England being then ruled by the peaceful Edward the confessor. After William of Normandy had settled himself on the English throne, many noble Saxons sought refuge at the Scottish court, and among them Edgar Atheling, nearest of kin to the confessor, with his mother Agatha, and his sisters Margaret and Christina. Margaret, who was young, beautiful, and pious, captivated the heart of the Scottish king, and a marriage quickly followed. Her biographer, Turgot (also her chaplain and confessor), tells us how earnestly and affectionately she labored to civilize the people and to "enlighten" her husband. Malcolm, although a man of vigorous intellect, could not read her missals and books of devotion, but he used to kiss them in token of reverence, and he caused them to be richly bound, and ornamented with gold and jewels. The retinue of the king began to show something of a royal magnificence, and his plate was, according to Turgot, "at least gilt or silvered over." But Malcolm's new relations, unfortunately, embroiled him with the Normans. In 1070 he crossed the border, harried Northumberland and Yorkshire, but was soon obliged to retreat. William the conqeror retaliated in 1072, and wasted Scotland as far as the Tay. At Abernethy, Malcolm was compelled to acknowledge him as his liege lord but (as the Scottish historians hold) only for such parts of his dominions as had belonged to England—viz., Cumbria and the Lothians. War broke out again between England and Scotland on the accession of William Rufus, probably at the instigation of the fugitive Anglo-Saxons and the discontented Normans, who had been pouring into the country during the iron reign of William, and had obtained large grants of land from the Scottish monarch. Nothing of note, however, happened, and peace was again concluded; but the seizure of Carlisle by the English king not long after provoked a fresh rupture, and, in 1093, Malcolm again crossed the border, and laid siege to Alnwick; but while so engaged, he was suddenly attacked, defeated, and slain, Nov. 13, 1093. His wife died immediately on hearing the fatal news.

Malcolm, surnamed "The Maiden," grandson of David I., succeeded that monarch, May 24, 1153, when only in his 12th year. He had no sooner mounted the throne than a Celtic insurrection, headed by Somerled, lord of the Isles, broke out. Some years after, another insurrection broke out among "the wild Scots of Galloway," under their

chief Fergus, to crush which Malcolm had to employ a large force. In 1161 he had to chastise a revolt of the men of Moray, and to put down a second rebellion of Somerled. He died at Jedburgh, of a lingering disease, Dec. 9, 1165, at the early age of 24.

MALCOLM, Sir JOHN, G.C.B., a British statesman and historian, was b. at Burnfoot, parish of Westerkirk, Dumfriesshire, May 2, 1769, and at the age of 14 went to India as a cadet in the Madras army. About 1790 he commenced to devote his leisure hours to the study of the oriental languages, especially Persian. He distinguished himself at the siege of Seringapatam in 1792, and was appointed to the staff as Persian interpreter. In 1800 he was sent as ambassador to Persia, to form an alliance with that country against Bonaparte, in which he succeeded. In 1802, 1807, and 1809 he was again sent as minister-plenipotentiary to the Persian court; and shortly before his final return, received from the shah the order of the "Sun and Lion," and the titles of "Kahn" and "Sepahdar of the Empire." In 1803 he had been appointed president of Mysore; and during the two following years his administrative talents had been of most important service to the government in reducing to order and tranquillity the newly conquered Mahratta states. In 1812 he returned to England, received the honor of knighthood, and, after a lapse of five years, returned to India as the governor-general's political agent in the Deccan, and with the rank of brig.gen. in the Indian army; in the latter capacity he greatly distinguished himself in the wars against the Pindarris and Holkar. In 1827 he was appointed governor of Bombay, but finally left India in 1830. He died of paralysis at Windsor, May, 1833. Malcolm's writings are highly esteemed as authorities; they are: *A History of Persia* (London, 1815, 2 vols. 4to; 2d ed. 1828); *Memoir of Central India* (2 vols. London, 1823); *Political History of India from* 1784 *to* 1823 (2 vols. 8vo. 1826); and *Life of Lord Clive* (London, 1836), a posthumous work. The life and correspondence of Malcolm were published by John W. Kaye, in 2 vols. 8vo (London, 1856).

MALCOM, HOWARD, D.D. LL.D., 1799–1879; b. Philadelphia; graduated at Dickenson college in 1817; studied theology at Princeton seminary; was ordained, and settled as pastor of a Baptist church at Hudson, N. Y. In 1825–26 he traveled extensively in behalf of the American Sunday-school Union in whose organization he took a prominent part; in 1827 he was pastor of the Federal Street Baptist church, Boston; in 1835 he was sent to visit the Baptist missions in India, Burmah, Siam, China, and Africa; in 1839–49 was president of the college at Georgetown, Ky., and of the university of Lewisburg, Penn., in 1851–59, acting also as professor of mathematics and moral philosophy in both institutions. On account of throat disease he left the university and retired to Philadelphia. In 1841 he received the degree of D.D. from the university of Vermont and Union college, N. Y., at the same time, and of LL.D. from the Lewisburg institution after his resignation. He was one of the founders of the American tract society, and a vice-president from the beginning. He published a *Dictionary of the Bible*, which was often republished in this country and in England; *Travels in South-eastern Asia; Index to Religious Literature; Nature and Extent of the Atonement; The Christian Rule of Marriage; Memoir of Mrs. Malcom;* edited also *The Imitation of Christ;* Robert Hall's *Help to Zion's Travelers;* Law's *Serious Call;* Butler's *Analogy of Religion*, with introduction, notes, etc. He has published also several addresses, and contributed many papers to periodicals.

MALCZEW'SKI, ANTONI, 1792–1826; b. Poland; educated by a French private tutor at his home in Dubno, and subsequently a student at Krzemieniec, where he showed a decided aptitude for mathematics. In 1811 he entered the Polish army in the hope of gaining a position which would enable him to marry a cousin with whom he had fallen in love—the family estate, impoverished by his father, a gen. in the Polish and afterwards in the Russian army, being insufficient to justify him in marrying. She married, however, a richer man, in 1812, and Malczewski's character seems to have derived from this disappointment a misanthropy, which is manifest in all his poetry. When Russia took possession of Poland he received an appointment on the suite of Alexander II., but in 1816, in consequence of a duel, left the army and spent the next five years in travel in Switzerland, Italy, and France. In 1821 he settled on a farm in the Ukrains, and during his residence there devoted himself to the study of his native language, which he had long neglected for the French. He had spent what property he had during his travels, his farming experiment proved a failure, and he was dependent on the charity of his landlord for the lodgings in Warsaw where he died. His poem *Maria*, in two cantos, was published at Warsaw shortly before his death. It had been written at his farm in the Ukraine. Received with entire neglect at first, then attacked on the score of its deficiencies in language and versification, it finally took a place in popular favor second only to some of the works of Mickiewicz.

MAL'DAH, a t. of British India, in Bengal, the chief t. of a district of the same name, is situated on the left bank of the Mahununda, about 190 m. n. of Calcutta. In the rainy season it is nearly insulated. It is a wretched place, consisting of ruined houses, forming narrow, irregular streets. Pop. '71, 5,262.

MAL'DEGEM, a small manufacturing t. of Belgium, East Flanders, 17 m. n.w. of Ghent. Population upwards of 6,000, who are employed in the manufacture of tobacco, and in brewing and cotton-printing.

MALDEN, a t. of Middlesex co., Mass., 4 m. n. of Boston, on the Boston and Maine railroad; pop. 7,367; the Malden river furnishes water-power for several factories. There are 2 weekly newspapers, 2 banks, and hotels, schools, etc. It is one of the suburbs of Boston, and has attracted from that city a fine class of business men, who find it a pleasant home.

MAL'DIVE ISLANDS, a chain of low coral islands in the Indian ocean, about 400 m. w.s.w. of Ceylon. They extend 500 m. in length by 45 m. in average breadth, and consist of 17 groups or atolls, each atoll surrounded by a coral reef. The entire number, including the islets, is estimated at about 50,000. Mali, the largest of the chain, and the residence of the native prince, who is called "the sultan of the twelve thousand isles," is 7 m. in circumference, and contains a population of 2,000. The population of the whole chain is estimated at 150,000. Each island is circular in form, with a lagoon in its center, and has an elevation above the sea in no case of more than 20 ft. at high-water mark. The larger and inhabited islands are clad with palm, fig, citron, and bread-fruit trees. Grain is also abundantly produced. Wild-fowl breed in prodigious numbers; fish, rice (imported from Hindustan), and cocoa-nuts constitute the food of the inhabitants, who are strict Mohammedans. The "sultan" sends an annual tribute to the governor of Ceylon.

MALDON, a market t., river port, and municipal and parliamentary borough of England in the county of Essex, a mile below the confluence of the Chelmer and the Blackwater, and 9 m. e. of Chelmsford. Besides the manufacture of crystallized salt, brick-making, brewing, and iron-founding, the usual branches of industry connected with a port are carried on. In 1872, 1139 vessels (67,161 tons) entered, and 805 (36,144 tons) cleared the port. Since 1867 Maldon returns only one member of parliament. Pop. '71 5,586.

MALEBRANCHE, NICOLAS, a French philosopher, b. Aug. 6, 1638, at Paris, where his father was president of the chamber of accounts. He was deformed and sickly, and from his childhood fond of solitude. At the age of 22 he entered into the congregation of the oratory, and devoted himself to the study of Bible history and of the fathers of the church till Descartes's treatise, *De Homine*, falling into his hands, attracted him to philosophy. His famous work, *De la Recherche de la Vérité* (3 vols. Paris, 1674, and other editions), displaying great depth and originality of thought, combined with perspicuity and elegance, had for its object the psychological investigation of the causes of the errors to which the human mind is liable, and of the nature of truth and the way of reaching it. He maintains that we see all things in God (his famous *Vision en Dieu*); that all beings and thoughts exist in God (*Dieu est le lieu des esprits, comme l'espace est le lieu des corps*); and that God is the first cause of all changes which take place in bodies and souls, which are therefore merely passive therein. His system is a kind of mystic idealism. It was immediately opposed by Ant. Arnauld, Bossuet, and many others, and was subjected to a thorough and critical examination by Locke and Liebnitz. Besides the work above mentioned, Malebranche wrote a *Traité de Morale*, a *Traité de la Communication de Mouvement*, and *Conversations Métaphysiques Chrétiennes*, in the last of which he endeavored to exhibit the harmony of his philosophic views with Christianity. He died at Paris (as English critics are fond of saying) of a dispute with the subtle Berkeley, Oct. 13, 1715.

MALE FERN. See FERN, MALE.

MALESHERBES, CHRÉTIEN GUILLAUME DE LAMOIGNON DE, a distinguished French statesman, was b. at Paris, Dec. 6, 1721, and educated at the Jesuits' college; he became counselor to the parliament of Paris in 1744, and succeeded his father as president of the court of Aids in 1750, where his clear judgment, strict integrity, and humane disposition enabled him to be of great service to his country. A quiet but determined opponent of government rapacity and tyranny, he watched the ministry with a jealous eye, and was indefatigable in his efforts to prevent the people from being plundered. About the same time (1750) he was appointed censor of the press. This was a most unsuitable office for him, but he appears to have accepted it lest it should fall into the hands of some mere bigot or court hireling; and so tolerant was he that French authors pronounce the period of his censorship "the golden age of letters." To Malesherbes we owe, among other things, the publication of the famous *Encyclopédie*. In 1771 his bold remonstrances against the abuses of law which Louis XV. was perpetrating, led to his banishment to one of his estates. At the accession of Louis XVI. (1774), who esteemed Malesherbes, he was recalled, and entered Paris in triumph. In 1776 he resigned, on the dismissal of Turgot, all official employment, and, from this period on to the revolution, spent his time in travel or in the improvement of his estates. The first storms of that wild period passed by and left him unscathed; but when he heard that the unfortunate king, who had always neglected to profit by his advice, was about to be tried by the convention, he magnanimously left his retreat and offered to defend his old master. The convention granted permission, but from that day Malesherbes was himself a doomed man. He was arrested in the beginning of December, 1793, and guillotined April 22, 1794 along with his daughter and her husband, M. de Chateaubriand, brother of the famous author of that name. Malesherbes was a member of the French academy, an able writer

on political, legal, and financial questions, and one of the most virtuous and high-minded statesmen of the 18th century.

MALET, CLAUDE FRANÇOIS DE. See MALLET, *ante*.

MALHERBE, FRANÇOIS DE, 1555–1628; b. Caen, France; son of an untitled magistrate. His education was begun at Caen, continued in Paris, and completed by travel under the tuition of a Calvinist, Richard Dinoth, who accompanied him to Heidelberg and Basle. But religious instruction irritated him. He broke with his father, who was a Calvinist, and found favor with Henry, duc d'Angoulême, to whom he became private secretary at Aix. He was already noted for his critical taste in poetry, though not for his own productions, and acquired a fame for the piquant ill-nature of his wit. Naturally it brought him ill fortune, and for many years after the death of his patron he suffered for means to live. His poem *Larmes de St. Pierre*, published in Paris in 1587, was his first noted work. Near 1600 the attention of Henry IV. was attracted to the poet, who soon after was called to the court, and from that time ranked as the first poet of France. Avarice, wit, in epigram and verse, and terse forms of expression, were his characteristics.

MALIBRAN, MARIA FELICITA, one of the most celebrated mezzo-soprano singers of recent times, b. at Paris, Mar. 24, 1808, was the daughter of Manuel Garcia, a Spanish singer and teacher of singing. When she was still very young her reputation extended over Europe. Her father attempted to establish the Italian opera in New York, but without success; and, on account of his circumstances, she married M. Malibran, a Frenchman, who was supposed to be one of the richest merchants of that city, but who soon became bankrupt, on which she went again upon the stage, and was received with great enthusiasm in France, England, Germany, and Italy. She expended, with remarkable benevolence, the great sums which she won. Her first marriage having been dissolved, she married M. Beriot, a famous violinist, in 1836; but in September of that year she died at Manchester, whither she had gone to take part in a musical festival. Malibran was a woman of noble heart and high intellect, and her conversation possessed an exquisite fascination. She has left a number of musical compositions, some of which are deservedly popular. A memoir of her was published in England shortly after her death, by the Countess of Merlin.

MALIC ACID ($C_8H_4O_8$,2HO), so called from *malum*, the Latin word for an apple, occurs abundantly in most acidulous fruits, particularly in unripe apples, gooseberries, and currants, in which it is found as an acid or super-salt of potash or lime, which gradually changes into a neutral salt as the fruit ripens. It crystallizes in groups of radiating acicular prisms, but, as the crystals are very deliquescent, it is usually obtained as a syrupy, semi-transparent mass, with a very sour smell, and readily soluble in water and alcohol.

The chemical changes which this acid undergoes under the influence of various reagents are very singular, and serve to illustrate many points in vegetable physiology in reference to the maturation of fruits, etc. Thus, nitric acid converts it into oxalic acid; hydrated potash, into oxalic and acetic acids; ferments, into succinic, butyric, acetic, and carbonic acids and water. When heated to about 350° it loses the elements of water and becomes converted into the two isomeric acids, malæic acid and fumaric acid (q.v.).

Malic acid forms two series of salts with bases, namely, neutral and acid salts. The most characteristic of these salts are the neutral malates of lead and of lime.

MALICE. While malice, in its ordinary sense, means an evil disposition or state of mind of one person towards another, in law it denotes the intent or purpose which precedes and causes an unjustifiable, illegal act. Malice, in law, is not confined to a particular intent of an act to the injury of a particular person, but to a general intent of injury preceding the unlawful act; thus, if one shoot A., intending to shoot B., he is nevertheless guilty of murder with malice prepense. Malice, in law, is divided, for convenience of proof, into express and implied. Express malice is where the defendant's intent to commit the crime is directly proved; implied malice is where the intent to commit the crime is presumed by the law from the facts, and where a defendant is shown to have intended an act, he is presumed to have intended all the consequences of that act. In the law of torts, malice means the unjustifiable commission of an act injurious to another.

MALICIOUS PROSECUTION, a prosecution, either criminal or civil, by regular process of law, unwarranted by the proved facts, and instituted without probable cause. As the person against whom such prosecution has been brought has been arrested or imprisoned if it were by criminal suit, and has been put to expense if it were by civil suit, he has a right to sue, and, if he can establish the groundlessness of the prosecution, to recover from the person who instituted it. The person who brings an action for malicious prosecution must show that the former action was groundless and is at an end; that it was conducted in regular course of law before a court of competent jurisdiction; and that it was malicious and without probable cause. Probable cause exists when there were such circumstances as would properly justify a man of sound discretion and reason in believing that the defendant committed the act for which the prosecution was begun. In the absence of probable cause, malice will be inferred; but if it be con-

clusively shown that the prosecutor acted in good faith, evidence of actual malice must be given. But, on the other hand, if probable cause be shown, proof of actual malice will not maintain an action. The guilt or innocence of the person prosecuted does not affect the question of probable cause, which depends upon the evidence of the existence, in the prosecutor's mind, of a belief, founded upon reasonable grounds, of the guilt of the accused person. What constitutes probable cause is a mixed question of law and fact; that is, if there be no dispute as to the facts, the court decides whether those facts constitute probable cause; but if the facts are disputed, the jury are to find the facts, under instruction from the court as to what facts are sufficient to make out probable cause.

MALIGNANT DISEASES, a name applied to those affections of the animal system characterized by a disposition to the formation of products which have the power of propagation at the expense of the normal tissues, or which so poison the blood that it soon becomes unfit to maintain life. Some of these diseases are tumors (q.v.), and come within the province of the surgeon, while others are the subjects of the physician. The principal malignant tumors are cancer (q.v.), and sarcoma (q.v.). The term malignant applied to diseases not surgical is sometimes rather indefinite, although in some cases the application is entirely appropriate. Scarlet fever, when of a very severe form, with sloughing of the affected tissues of the throat, and with blood-poisoning to the extent of producing death in 48 hours, is truly called malignant; but when less severe, although very dangerous, it is often called semi-malignant, and most cases are characterized by more or less tendency to malignancy. So in diphtheria, the severe cases, and which are more properly called putrid fever, or malignant sore throat, are essentially malignant. Asiatic cholera (q.v) is a malignant disease, and one of its names is malignant cholera. Malignant pustule (q.v) is also a malignant affection, but according to John Hunter's definition it would, perhaps, come under the head of tumor. One form of intermittent fever (q.v.) is truly malignant, as in some cases it is incurable, poisoning the blood and affecting the nervous system in a really malignant manner. There are forms of small-pox which are called malignant, but the term in this disease is of rather indefinite application, the disease not being essentially malignant, and only taking on that character because of the *excessive amount* of morbid matter, whereas the poison of diphtheria and of malignant or pernicious intermittent fever appears to possess intrinsic malignancy independent of quantity.

MALIG'NANT PUSTULE is a contagious and very fatal disease, common in France, where it bears the name of *charbon*, but of comparatively rare occurrence in England. It begins as a small, dark-red, painful spot, on which there soon appears a pustule or vesicle, seated on a hard, inflamed base. When this is opened, a black slough becomes apparent. This sloughing spreads rapidly, involving the cellular tissue, and sometimes even the adjacent muscles.

The disease appears to be caused by infection from horned cattle, which are sometimes affected by a similar disease, but it also arises by inoculation of diseased fluids. It is believed that flies which have alighted on the ulcers of diseased animals may occasionally convey the infection. The constitutional symptoms are much the same as those of putrid typhus fever; while the treatment consists in destroying the diseased surface by powerful caustics, in keeping up the strength by wine, brandy, beef-tea, bark with nitric acid, etc.; and in giving opiates in sufficient doses to relieve the pain during the day and to procure sleep at night.

MALIGNANT TUMORS. See CANCER and TUMOR.

MALINES', or MECHLIN, one of the chief cities of the Belgian province of Antwerp, 15 m. s.s.e. of the city of that name, on the navigable river Dyle. The pop. was, in 1876, 39,029. It has fine squares, noble buildings, and wide, regular streets, but is devoid of all signs of life and industry, having lost its former greatness, and fallen far behind all other Belgian cities in commercial enterprise and industrial activity. As the see of the cardinal-primate of Belgium, it still retains a certain degree of ecclesiastical importance, and possesses numerous churches, the most noteworthy of which is the cathedral of St. Romuald, a vast building, covering nearly two acres of ground, and adorned in the interior with many fine pictures and choice carvings. It was built between the 12th and 15th c., but one tower, 345 ft. in height, remains unfinished. The other objects most worthy of notice are the churches of St. John and of Our Lady, which contain works by Rubens; the town-hall, dating from the 15th c., and known as the Beyard; the market hall, an ancient building, with towers, erected in 1340, and now used as a guard-house; the splendid modern archiepiscopal palace; and the monument to Margaret of Austria, erected in 1849. Malines has two clerical seminaries, an academy of painting, a gymnasium, and a botanical garden. It still retains some of the important lace manufactories, for which it has been long noted, and manufactures caps and woolen goods, besides having considerable breweries. Malines constitutes an important central point of junction for the entire Belgian system of railways.

MALING'ERING, a term derived from a similar French word, signifies the feigning of disease, in order to avoid duty. This offense is punished very severely in the British army. For further particulars, see FEIGNING OF DISEASE.

MALL, or PALL-MALL (pr. Pell-Mell), a name given to places in London and other English towns where there were once alleys for playing tennis. See BALL.

MALLARD. See DUCK, *ante*.

MALLEABIL'ITY is the property which certain metals possess of being reducible to thin leaves, either by hammering (hence the corresponding German word, *hämmerbarkeit*) or by lamination between rollers. The order in which the malleable metals exhibit this property is as follows: gold, silver, copper, platinum, palladium, iron, aluminium, tin, zinc, lead, cadmium, nickel, cobalt. Gold far surpasses all the other metals in malleability, being capable of reduction into films not exceeding the 200,000th of an inch in thickness; and silver and copper may be reduced to leaves of great tenuity. Although gold and silver also present the property of *ductility* (q.v.) in the highest degree, there is no constant relation between the two properties; for example, iron, although it may be reduced to extremely thin wire, is not nearly so malleable as gold, silver, or copper.

MALLEA'CEÆ, a family of lamellibranchiate mollusks, regarded by many as a subfamily of *aviculidæ* (see PEARL OYSTER), and of which the typical genus *malleus* is remarkable—in an adult state—for the elongation of the ears of the shell, the other part of which at the same time assumes a curiously elongated, wavy, or crumpled form. The shell thus acquires the name of HAMMER SHELL. The species are natives of the East and West Indies and of the South seas.

MALLET, CLAUDE FRANÇOIS DE, b. June 28, 1754, at Dôle in Franche-Comté, became an eager supporter of the revolution, rose to the rank of a brig.gen. in 1799, was intrusted with the government of Pavia in 1805, but was removed from his office because of his extreme republicanism. He returned to Paris, and was engaged in a number of republican plots. Being, in June, 1812, thrown into confinement along with some royalists, he formed with them a scheme for overthrowing the empire during Napoleon's campaign in Russia. He made his escape from prison on the night of Oct. 23–24, along with the abbé Lafon, and entering the barracks, informed the soldiers that the tyrant had perished in Russia. He proceeded to liberate generals Guidal and Lahorie from prison; and having previously gained the support of a battalion of the Parisian guards, he called them to arms, and went to the residence of Hullin, the commandant of the city, whilst Lafon went with a platoon to the prefecture. He told Hullin of the death of the emperor, and the establishment of a provisional government, and on his manifesting doubt, drew a pistol and fired it in his face, wounding but not killing him; whereupon the adjutant, Laborde, rushing in, Hullin and he together overpowered Mallet, and took him prisoner. When interrogated, he declared that he would have made all France and all Europe his debtors if his enterprise had been successful, and maintained the same resolute coolness to the last. He was shot, along with his principal fellow-conspirators, Oct. 29, 1812.

MALLET, PAUL HENRI, 1730–1807; b. Switzerland. In 1752 he became professor of French literature in the university of Copenhagen, and gave his attention to the origin, antiquities, and mythology of the ancient peoples of the north, publishing the results of his study in the *Introduction à l'Histoire du Danemark*, published in Copenhagen, 1755–56. Returning to Geneva in 1760 to fill the chair of history in the academy, he became a member of the council of two hundred in 1764; visited Italy and England in 1766–67, and was charged by the queen of England to write the history of the house of Brunswick; in 1792 was obliged to leave Switzerland on account of his aristocratic affiliations; returned in 1801. His works, in addition to that noted above, are: *Mémoirs sur la Litérature du Nord*, 1759–60; *Monuments de la Mythologie et de la Poesie des Celts; De la Forme du Gouvernement Suedois;* and several works on Swiss history, books of travel, and a Swiss dictionary.

MALLOW, *Malva*, a genus of plants of the natural order *malvaceæ*, having a 5-fid calyx, with an outer calyx of three leaves; stamens cohering in a tube; numerous styles cohering at the base; and numerous one-seeded carpels fixed in a whorl around an axis, and forming a separable orbicular fruit. The species are herbaceous plants, or more rarely shrubs.—The COMMON MALLOW (*M. sylvestris*) is plentiful over most of Europe, and in Britain on waysides and heaps of rubbish. It is a perennial, with rather large bluish-red flowers on erect stalks. The DWARF MALLOW (*M. rotundifolia*), also a common native of Britain, has smaller whitish or reddish-white flowers. These two plants have a mucilaginous and somewhat bitter taste, and the leaves are used as an emollient and demulcent medicine; a decoction of them being employed in cases of irritation of the pulmonary and of the urinary organs; and poultices made of them are very frequently employed to allay external inflammation. Other species have similar properties.—The MUSK MALLOW (*M. moschata*), not unfrequent in England, but rare in Scotland, has a faint musk-like smell.—The fiber of *M. crispa* is used in Syria for textile purposes, and the fibers of many species are probably fit for similar use, and for the manufacture of paper. The young leaves of some are occasionally used as boiled vegetables.—A species of mallow (*laxatera arborea*) grows on the Bass Rock, and adjacent mainland of Haddingtonshire.

MALLOW, a market t. and parliamentary borough of Ireland, in the county of Cork, is beautifully situated on the left bank of the Blackwater, 19 m. n.n.w. of the

county town. On the opposite side of the river, which is here crossed by a bridge of three arches, is the suburb of Ballydahin. The town is resorted to in summer on account of its mineral waters, and contains a neat spa-house. Tanning, brewing, and the manufacture of salt are carried on. Near Mallow are large flour-mills. Pop. '71, 4,165. Mallow returns one member to the house of commons.

MALMAISON, La, a village 7 m. w. of Paris, with many historical souvenirs. The name is derived from the fact that it was a favorite resort of robbers in the 9th c., whose depredations in the neighborhood gave their place of sortie the name *mala mansio*. In the 13th c. it was but a part of a farm; in the 14th it was attached to the property of the abbaye St. Denis. Occupied successively by families of little note during succeeding centuries, it happened to be purchased in 1798 by the widow Josephine Beauharnais, who paid about $32,000 for the property. The charms of her society there attracted not only the general Bonaparte, but much of the most elegant society of France in 1798–99. The place was tastefully improved, and became the meeting place for poets, authors, politicians, and the military celebrities of the day. Some of the most beautiful and fascinating women of France aided Josephine to make it one of the centers of a society which sought to reproduce the courtly manners of old France, with the advent of the new military era of Napoleon, who here wooed the future empress. It was largely through her fine tact in making powerful friends at Malmaison that Napoleon was enabled to make the *coup d'etat* in 1799 which made him first consul. After her marriage Josephine continued to embellish the park with gardens, summer-houses, grottoes, waterfalls, lawns and parterres and farm and shepherd cottages; and the chateau was greatly improved in many ways and made interesting by a library and the choicest works of art and materials for pleasure, until it finally became a little palace. After Josephine became empress Malmaison was little occupied, until the divorce in 1809, when she retired to it, and kept up a little court. Alexander of Russia visited her there just before her death in May, 1814. After Napoleon's return from Elba he went to visit the scene of his first love, and two months later, after the defeat of Waterloo, he passed five days there with Hortense de Beauharnais, ex-queen of Holland. The property then reverted to her son, Eugène de Beauharnais. In 1826 it was purchased by a Swedish banker, Haguerman; in 1842 by queen Maria Christina of Spain for 500,000 francs; and in 1861 by Louis Napoleon for 1,500,000 francs, and by him improved and restored to much of its ancient beauty.

Among the paintings most interesting at Malmaison is a portrait of Josephine by her daughter Hortense; and one of Bonaparte at Malmaison by D'Isaby.

MALMESBURY, a market t. and parliamentary borough of England, in the co. of Wilts, 20 m. n.n.w. of Devizes, and 96 m. w. of London. Pop. (1871) of parliamentary borough, 6,879. It returns one member to the house of commons.

Malmesbury is a very ancient and interesting town. Here, according to William of Malmesbury, a monastery was founded before the year 670. The abbey afterwards became a cloth-factory. The remains of the abbey-church, partly early Norman, and partly decorated English, may still be seen. There are several other relics of antiquity in the place.

MALMESBURY, James HARRIS, first earl of, 1746–1820; b. England; son of James Harris, the author of Hermes. He was educated at Winchester, Oxford, and Leyden, and, after traveling on the continent, was appointed, at the age of twenty-one, secretary of the Spanish embassy through the influence of lord Shelburne. He was acting as *chargé d'affaires* at Madrid, at the time of the dispute between England and Spain in regard to the Falkland islands, and he displayed such skill in the negotiations in this affair, that, in 1771, he was appointed minister-resident at Berlin, where he remained for four years. In 1777 he was made ambassador to Russia, and in 1780 he received the order of the bath. The state of his health compelled him to leave St. Petersburg in 1784, and he soon accepted from the Pitt ministry the post of minister to the Hague, to which it had been the intention of Fox, to whose party he belonged, to send him. There, in 1788, he succeeded in negotiating a treaty of alliance between Holland and Prussia; and in acknowledgment of his services was made baron Malmesbury the same year. Returning to England he entered parliament, of which, in spite of his long absences, he had been a member since 1770. He was a whig till 1793, when he became a supporter of the administration, and Pitt sent him once more to negotiate a treaty between England, Prussia, and Holland, a mission which he successfully discharged. In 1794 he negotiated the marriage between the prince of Wales and Caroline, daughter of the duke of Brunswick. In 1796 he went to Paris and in 1797 to Lisle on fruitless negotiations for peace with the French republic; and these were his last missions, as he deemed himself incapacitated by a growing deafness from taking further part in public affairs. In 1800 he was made earl of Malmesbury and viscount Fitzharris.

MALMESBURY, James Howard HARRIS, third earl of; b. England, 1807; grandson of the first earl. He was educated at Eton and Oxford; was returned to parliament as a conservative in 1841, but succeeded his father in the peerage the same year. He was secretary for foreign affairs in lord Derby's first administration, and was efficient in bringing about the recognition of Louis Napoleon by the French empire. Lord Malmesbury occupied the same position in the second cabinet of lord Derby, when he endeavored to prevent the war between France and Italy, and Austria. When Lord Derby formed his

third government in 1866 he declined to be foreign minister on account of his health, but became lord keeper of the privy seal, remaining in office till 1868. From 1874 to 1876 he was again privy seal. He edited *The Diaries and Correspondence* of his grandfather, 1844; and *The First Lord Malmesbury and his Friends*, 2 vols. 1870.

MALMESBURY, WILLIAM OF, an early English historian, was b. near the close of the 11th c., probably in Somersetshire, educated in the monastery whence he derived his name, and of which he became librarian. He died some time after 1142, but the exact date is not known. Malmesbury's principal works, which are written in Latin, are *De Gestis Regum*, a history of the kings of England from the Saxon invasion to the 26th year of Henry I.; *Historiæ Novellæ*, extending from the 26th year of Henry I. to the escape of the empress Maud from Oxford; and *De Gestis Pontificum*, containing an account of the bishops and principal monasteries of England from the conversion of Ethelbert of Kent by St. Augustine to 1123. The first of these was translated into English by the rev. John Sharpe (Lond. 1815), and has been reprinted in Bohn's antiquarian library, under the editorship of Dr. Giles (1847). Of his other works, Gale has printed his *Antiquities of Glastonbury*, and Wharton his *Life of St. Wulstan*, in his *Anglia Sacra*. Malmesbury gives proof in his writings of great diligence, good sense, modesty, and a genuine love of truth. His style is much above that of his contemporaries.

MAL'MÖ, or MALMÖHUUS, a Swedish province or læn on the Baltic; 1852 sq.m.; pop. '73, 322,175. Its capital city, bearing the same name, is 16 m. s.e. of Copenhagen, and has over 25,000 population, situated on the sound. The principal export of the province is grain; horses and cattle are bred in large numbers, and the city is well supplied with schools of a high grade, and is very prosperous.

MAL'MÖ, the principal town of the "læn," or district, of Malmöhuus, in Sweden, is situated on the sound, nearly opposite Copenhagen, and had, in 1874, a population of 30,676. Malmö is a busy sea-port, maintaining an active steam and sailing communication with Copenhagen and all the great Baltic and German ocean ports, and has manufactures of stockings, tobacco, soap, sugar, woolen goods, etc. It is the seat of a government department, and is a lively, pleasantly situated town. The ancient fortifications, most of which are now converted into public walks, date from the time of Eric of Pomerania, who, in 1434, erected strong lines of defense on the seaside of the town, and built the castle, which still remains. Malmö was an important place of landing and embarkation as early as 1259, and through the middle ages it was extensively visited by German and other traders. In 1523 it was the scene of the signing of a treaty of peace between the Danes and Gustavus Vasa.

MALM'SEY (Malvasian wine; Fr. *vin de Malvoisie*), a name originally bestowed on the red and white wines of Napoli di Malvasia, in the Morea, and afterwards on similar wines produced in Cyprus, Candia, and other islands of the archipelago. Malmsey wines are of a luscious sweetness, and have a most peculiar bouquet. The Malmsey wines of commerce are mostly the produce of Teneriffe, the Madeiras, the Azores; the Lipari isles, Sardinia, Sicily, and Provence. Malmsey is made from grapes grown on rocky ground, fully exposed to the sun, and left to hang on the vines for a month longer than those used to make dry wines, by which time they are partially withered

MALONE', the capital of Franklin co., N.Y., on the Salmon river and the Ogdensburg and Lake Champlain railroad, midway between Ogdensburg and Rouse's Point. Pop., 7,186. It is the center of a prosperous agricultural district and of a large trade. It has well-established churches, excellent schools, two banks, and two newspapers.

MALONE, EDMOND, one of the most respectable editors of Shakespeare, was b. in Dublin, Oct. 4, 1741, and educated at the university of that city, where he won a high reputation as a scholar, and took the degree of B.A. In 1767 he was called to the Irish bar; but soon after, becoming possessed of a considerable fortune, he went to London, and devoted himself to literary pursuits. His first appearance as an author was in 1780, when he published 2 vols. supplementary to Steevens's edition of Shakespeare (1778). His next achievement—though in this he was only one of several—was exposing the splendid forgeries of Chatterton. He also contributed some notes to Steevens's third edition of Shakespeare, published in 1785, in which he occasionally controverted the opinions of the editor. This led to a serious quarrel between the two, in which Steevens was wholly to blame. Malone's own edition of the great dramatist (1790) was warmly received. The essays on the *History of the Stage*, and on the *Genuineness of the Three Plays of Henry VI.*, have been praised in an especial manner. In this work, Malone displays extreme good sense, much acuteness, extensive research, and a becoming respect for the text of the earlier editions. In 1796 he again signalized himself as a literary detective by exposing the Shakesperean forgeries of the Irelands. In 1797 he published a posthumus edition of the works of his friend sir Joshua Reynolds. His death took place May 25, 1812. He left behind him a large quantity of materials for another edition of Shakespeare, which appeared in 1821, in 21 vols., under the editorship of Mr. James Boswell. See *Life of Edmond Malone, with Selections from his Manuscript Anecdotes*, by sir James Prior (Lond. 1860)

MALPIGHI, MARCELLO, an eminent Italian anatomist, was born near Bologna in 1628, and died at Rome in 1694. He held, at different periods of his life, the professorship of

medicine in Bologna, Pisa, and Messina. In 1691 he was summoned to Rome, and appointed chief physician and chamberlain to pope Innocent XII.

He is now chiefly known for his discoveries in the anatomy of the skin, of the kidney, and of the spleen; and although the so-called *rete Malpighii* of the skin is no longer regarded as a special structure, the *Malpighian bodies* or *corpuscles* of the kidney and the spleen still retain the name of their discoverer. He is also remarkable as being the first who examined the circulation with the microscope, and thus discovered the blood corpuscles. Amongst his most important works may be mentioned *De Formatione Pulli in Ovo; De Cerebro; De Linguâ; De Externo Tactûs Organo; De Structurâ Viscerum; De Pulmonibus;* and *De Structurâ Glandularum Conglobatarum.* His *Opera Posthuma* were edited by Petrus Regis of Montpellier; they contain a history of his discoveries and controversies, together with numerous autobiographical details.

MALPIGHIA'CEÆ, a natural order of exogenous plants; trees, or shrubs, many of them climbing shrubs or lianas. They often exhibit an anomalous formation of the stem, great part of the woody matter being deposited in lobed zoneless ribs. The leaves are simple, generally with glands on the stalks or underside. The calyx is 5-partite, generally with very large glands; the corolla of 5 petals convolute in bud; the stamens generally 10, often monadelphous, a fleshy connective projecting beyond the anthers. There are about 600 known species, natives of tropical countries, and chiefly of South America, many of them having gaudy flowers. A few produce timber of a bright yellow color. The bark of some species of the genus *Byrsonima* is astringent and medicinal, and at one time attracted considerable attention as a remedy for pulmonary consumption. It is known as *alcornoque bark.* The fruit of some, as the BARBADOES CHERRY (q.v.), is pleasant.

MALPLAQUET, a village (pop. 400) in the department of Nord, France, 20 m. e. of Valenciennes, and close to the Belgian frontier, is celebrated for the bloody defeat of the French, under marshal Villars, by the British and Dutch, commanded by the duke of Marlborough and prince Eugene, Sept. 11, 1709. The forces engaged consisted of more than 200,000 men, the allies having a slight superiority in numbers; and the loss on each side amounted to about 20,000 men, the French losing also many standards and cannon. Marshal Villars was severely wounded early in the engagement, and the command devolved upon the old marshal de Boufflers, under whom the French, after great slaughter, retreated in good order. The result of the conflict was the capture of Mons.

MAL'STROM, or MOSKÖESTROM ("whirling stream"), the most famous whirlpool in the world, is situated on the Norwegian coast, between Moskŏe and Moskenäs, two of the Loffoden (q.v.) isles. The tremendous current that rushes between the Great West fjord and the outer ocean through the channels between the Loffoden isles creates many other dangerous currents, such as the Galström, Napström, etc.; but these are not to be compared with the famous Malström. The current runs for 6 hours from n. to s., and then 6 hours from s. to n., producing immense whirls. The depth of the water has been ascertained to be about 20 fathoms, while immediately to the w. of the straits the soundings are from 100 to 200 fathoms. The whirlpool is greatest at high or low water; and when the wind blows directly against the current, it becomes extremely dangerous, the whole sea for several miles around being so violently agitated that no boat can live in it for a moment. In ordinary circumstances it may be traversed even across the center without apprehension. The stories of ships, whales, etc., being swallowed up in the vortex are simply fables; at the same time there can be no doubt that a ship, once fairly under the influence of the current, would certainly either founder or be dashed upon the rocks, and whales have often been found stranded on the Flagstadt coast from the same cause.

MALT AND MALTING. See BEER.

MALTA, an island and British possession in the Mediterranean, 17 m. long by about 9 broad, with an area of about 115 sq.m.: it is of carbonaceous limestone, of the tertiary aqueous formation, and occupies a very central position in the Mediterranean sea, being distant some 54 m. from the Sicilian coast, and about 200 from cape Bon on the African coast. From its position, and also from the enormous strength of the fortifications, Malta is a possession of immense value to any commercial nation which possesses a navy strong enough to prevent it being blockaded. It happens, consequently, that Malta is one of the most important, after India, of the British dependencies, for it is not in any sense a colony. Possessing one of the most splendid harbors in the world, with such an even depth that the largest vessels may anchor alongside the very shore, the island forms at once an admirable station for a fleet to command the Mediterranean—a military focus, where a force protecting the route to Egypt and India can be concentrated—and a useful entrepôt for receiving the manufactures of Britain, which the small craft of the Mediterranean carry to every point on the shore of that inland sea and its tributaries. By whomsoever possessed, Malta has always been held in high estimation. Between it and Gozzo, or Gozo (q.v.), lies the small island of Comino; and off this last the still smaller islet, Cominotto, rears its rocky crest, while elsewhere round the shores of Malta and Gozo, a few rocks stud the sea, sustaining each a few fishermen, and affording herbage for goats on their moss-grown summits; among these are Filfla, with a

venerable church; Pietro Nero, or Black Rock; Scoglio Marfo, Salmonetta, and the *Hagira tal general*, or fungus rock, where grows the famed *fungus melitensis* (see CYNOMORIUM). Malta and Gozo, with their adjacent islets, form together a compact little realm, celebrated in history, possessing a magnificent capital in Valetta, and, from the fact that, owing to peculiar circumstances, vast contributions came to Malta from all Catholic Europe, adorned with public buildings, institutions, and works out of all proportion to its actual intrinsic importance.

In physical conformation, Malta is comparatively low, its highest point not exceeding 590 ft. above the sea-level. The surface is diversified by a succession of hill and dale, the land being intersected by parallel valleys, running from s.w. to n.e., the most considerable of which is the vale called Melleha. Across the island stretch the Benjemma hills or crags, and many spurs branch from them, which give a picturesqueness to the scenery. From the spongy nature of the limestone of which the island is composed, much of the rain falling in the wet season soaks in, and being evaporated through the thin alluvial covering by the heats of summer, keeps the ground moist, and gives it a fertility which could not otherwise be expected from so scanty and comparatively poor a soil. So thin, indeed, was the original surface-soil, that considerable quantities of earth were imported into Malta from Sicily. The productiveness of the soil must also be attributed to the quantity of carbonate of lime held in a minutely divided state above the entire face of the rock.

Malta shows no signs of volcanic formation; but the action of the sea among its cliffs has hollowed out grottoes and caverns in almost every direction, and some of considerable extent. The inhabitants are industrious, and good agriculturists, and every foot of the soil is diligently cultivated. On the whole, about the quantity of superior kinds of grain consumed is raised on the islands, and of inferior sorts a considerable amount is exported. Wine, resembling that of Spain, is produced; the sugar-cane is cultivated. The vegetable products comprise all that flourish in Italy, as aloes, oranges, and olives, with many plants of a more tropical growth. Malta was famed of old for roses. Salt and soda are manufactured; there are quarries of marble, alabaster, and building-stones. Mules and asses are remarkable in Malta for their strength and beauty, but horned cattle are small. Maltese goats are fine animals. The birds of Malta are renowned for their splendid plumage; and its bees produce an aromatic honey, excelled in no other locality.

Medina, the former capital of the island, now known as Citta Vecchia, or Notabile, is a handsome old town, lying inland; it contains the ancient palace of the grand masters of the order of St. John, the cathedral, a college, and is still the seat of the bishopric. Pop. 7,000. Its rival and successor is Valetta (q.v.). The numerous *casals* or villages scattered throughout Malta and Gozo are nearly built, and generally present an aspect of industry and frugal happiness.

It is thought by some that Malta was the *Hyperion* or *Ogygia* of Homer, but there is little doubt that the Phenicians colonized the island at a very early date, probably in the 16th c. B.C. Before they were dispossessed by the Greeks in 736 B.C., they had developed considerable commerce. The Greeks called the island *Melitas*, and were driven out by the Carthaginians about 500 B.C. As early as the first Punic war, it was plundered by the Romans, but did not come finally into their possession until 242 B.C. They valued it highly, on account of its use as a commercial entrepôt; and also for its cotton and linen cloths, fabrics then, as now, manufactured of wonderful fineness by the Maltese. The island remained under its old laws, governed by a proprætor, subject to the prætor of Sicily. On the n. coast is the port of St. Paul, and here tradition fixes the wreck of the ship carrying that apostle to Rome. On the division of the empire, Malta followed the fortunes of the eastern division. During the 5th c. it fell successively under the Vandals and Goths, whose barbarism nearly annihilated its commerce. In 533 Belisarius recovered Malta to the Byzantine empire, in nominal union with which it remained for more than three centuries; but its prosperity had departed, and its civilization almost vanished amid constant local feuds. In 870 the Arabs destroyed the Greek power in Malta, and fortified the harbor as a station for their corsairs. Count Roger, of Sicily, drove out the Arabs in 1090, and established a popular council for the government of the island, composed of nobles, clergy, and elected representatives of the people. This council, in a more or less modified form, subsisted for 700 years. Under a marriage-contract, Malta passed to the German emperor, who constituted it a marquisate, but it had ceased to be a place of trade, and was merely a garrison of more expense than value. Charles of Anjou, after overrunning Sicily, made himself master of Malta, which clung to the French even after they had been expelled from Sicily; but after a time the houses of Aragon and Castile successively held the island. Subsequently, the emperor Charles V. took possession of Malta, and, in 1530, granted it, with Gozo and Tripoli, in perpetual sovereignty to the knights of the order of St. John of Jerusalem, from whom the Turks had recently captured their great stronghold at Rhodes. The knights raised by degrees the stupendous fortifications which render Malta so powerful, and, moreover, spent their large income in beautifying the island in every way. Meanwhile, they rendered incessant services to Christendom in the chastisement of the ferocious Barbary pirates. To revenge these acts, the Turks brought immense forces against Malta in 1557, and again in 1565. The latter siege was carried on by the sultan Solyman himself, with the

flower of the Ottoman army; but the grand master La Valette opposed a heroic resistance, and he was forced to re-embark with the loss of more than 25,000 of his best troops. The defenders lost 260 knights and 7,000 Maltese soldiers; and their gallantry was the theme of admiration throughout the world. After this siege the knights built Valetta. In 1571 they, with the Maltese, behaved most courageously at the battle of Lepanto, where the Turks lost 30,000 men. Though waging perpetual war with the Moslem, the knights continued in possession of Malta until 1798, when overcome by Bonaparte's treachery, and disorganized by internal quarrels, the order surrendered their noble fortresses to the French. After pillage and infamous treatment by the republican forces, the Maltese rose in a few months against their oppressors, and after a siege of two years, British auxiliaries arriving, the French garrison of Valetta capitulated to the English gen. Pigot. The treaty of Amiens stipulated that Malta should be restored to the knights of St. John; but the Maltese loudly protested against such an arrangement, and preferred the peaceful government of Great Britain. The British government consequently refused to make the transfer, appreciating also, doubtless, the vast value of their new possession, and Napoleon made the refusal one of his grounds for the resumption of hostilities. The congress of Vienna recognized Malta as a British dependency, the condition in which it has since remained.

In 1874 Malta and Gozo, with the adjacent islands, together contained 145,599 inhabitants (including the British residents and foreigners, but excluding the military, who numbered 6,611). The population was increasing rapidly, but the annual rate of increase had declined from 1858. The upper classes speak Italian, but the real language of the people is a patois compounded from many sources, as must be expected from so checkered a history. Arabic, however, so far predominates that the Maltese find little difficulty in communicating with the Barbary peasants. It is alleged by some that the Maltese language—if its Italian and German elements were eliminated—would remain almost pure Punic, and would accurately represent the speech of Carthage at the time of its destruction. The religion of the people is strictly Roman Catholic, and, considering that the British flag waves over the island, but a scanty toleration is granted to other forms of faith. There are good provisions for education; a college at Valetta, where degrees are conferred in divinity, law, and physic; 65 public schools, with 8,324 pupils, besides 114 private places for education. There is also an excellent public library, free to all.

The commandant of the garrison is governor, and is aided in the civil government by a council of 16 members, of whom 8 are officials, and 8 are freely elected. The revenue amounted, in 1874, to £175,073, while the amount of the expenditure was £161,734. Customs and excise, with a few assessed taxes, provide the former; the latter is absorbed in the charges of the civil government, and in a contribution of £6,200 towards the military expenditure. On the other hand, Great Britain maintains a considerable force in the islands, mainly for imperial purposes, at a cost of about £370,000 a year. Besides a large body of British artillery, the garrison includes the royal Malta fencible artillery, a fine native regiment of 639 officers and men. There is an extensive arsenal, and a very important dock-yard, Malta being the headquarters of the British fleet in the Mediterranean. Taken altogether, Malta is a possession the British highly value; it is nearly, if not quite, as strong as Gibraltar, and far more useful.

The public debt amounted, in 1875, to £268,248, at a very low rate of interest. In 1875 the vessels which entered and cleared the port, exclusive of the coasting-trade and steamers, had a total tonnage of 4,832,000 tons. Of this total about 4,000,000 tons are set down as representing British vessels. In the same year, the total value of the imports amounted to £10,325,000; while the exports were estimated at a total of £9,500,000—corn *en route* from Russia for the United Kingdom figuring very largely in the transactions.

MALTA, KNIGHTS OF. See JOHN, ST., OF JERUSALEM, KNIGHTS OF.

MALTEBRUN, KONRAD (properly, MALTHE BRUUN), an eminent geographer, b. Aug. 12, 1775, at Thisted, in Jutland, studied in Copenhagen, and at the outbreak of the French revolution, embraced with great ardor the liberal cause, so that being prosecuted upon account of political publications, he was twice obliged to flee from Denmark, and finally, in 1800, was condemned to perpetual banishment from his native country. He sought refuge in Paris, where he maintained himself by teaching and literary labors. In 1808 he began the *Annales des Voyages, de la Géographie et de l'Histoire* (24 vols.), which he concluded in 1814. In 1818 he began, along with Cyries, the *Nouvelles Annales*, etc. He devoted his pen to the support of Napoleon during his reign; and in 1815 became connected with an ultra-royalist journal, and a defender of the theory of legitimacy adopted by the congress of Vienna. His principal work is his *Précis de la Géographie Universelle* (8 vols. Par. 1824–28, with an atlas). He took part also in the *Dictionnaire Géographique Universelle* (8 vols. Par. 1821), and was secretary to the geographical society of Paris. He died Dec. 14, 1826.—His son, VICTOR ADOLPE MALTEBRUN (b. 1816), is one of the most eminent living geographers of France, and has succeeded his father as secretary of the geographical society of Paris.

MALTESE' CROSS, a cross of eight points, of the form worn as a decoration by the hospitalers (q.v.) and other orders of knighthood.

MALTESE DOG, a small kind of spaniel, with roundish muzzle, and long, silky, generally white hair. It is altogether useless, and fit only for a lapdog; but is a very ancient breed, being figured on Roman monuments, and noticed by Strabo.

MALTHA, a Greek name meaning soft wax, originally applied to a mineral fat from Kirwan, having a resemblance to wax, probably composed of paraffine; but now applied to certain kinds of bitumen, mineral tar, or asphalt. It differs but little from the semi-solid varieties of asphalt, although it is described as frothing more on boiling. Some specimens are said to contain a small portion of oxygen, and also nitrogen, but these are probably the traces of impurities, as well as the cause of the frothing. No satisfactory analysis has been made. See ASPHALT; BITUMEN; DEAD SEA; *ante.*

MALTHUS, THOMAS ROBERT, the founder of those opinions concerning the relation of population to the means of sustenance which have been named after him "Malthusian," was b. in the county of Surrey, in the year 1766. He was well connected, and graduated with honors in 1788, at Jesus college, Cambridge, of which he became a fellow. He became soon after clergyman of a small parish in his native county, and divided his time between his cure and the university libraries. In 1799 he left Britain to see foreign countries, along with the eminent traveler, Daniel Clarke. The great European war was then raging, and the most interesting portions of the continent of Europe were closed to our countrymen. Malthus, however, with an evidently keen anxiety to observe mankind under a variety of conditions, wandered through Sweden, Norway, Finland, and part of Russia, making notes of what he observed. Next year he took advantage of the short peace of Amiens to visit France and other portions of central Europe. These efforts to become acquainted with mankind are significant since. Although Malthus has the reputation of being a bold theorist, the charm of his writings consists in his practical knowledge of how men have existed and acted in various parts of the world and under diverse conditions; and his knowledge of actual human nature—his sagacity and accuracy, in short, in the details which he brought to bear on his great theory—were in a considerable measure the source of the great influence exercised by him over public opinion, and had the secondary effect of making his books readable even to those who made war on his conclusions. It was in 1798 that he first published his *Essay on the Principles of Population as it affects the Future Improvement of Society;* but in subsequent editions he so greatly enlarged and enriched the work, that it could hardly be identified with the first impression. The predominant idea of the book was evidently suggested by Hume's essay on the populousness of ancient nations, in which vague statements as to the vast multitudes of human beings subsisting in any place, or wandering from place to place, are brought to the test of the means of subsistence at their disposal. Where there is an accurate census, the number of people living on the portion of the globe covered by it is, of course, known to within a trifle of the truth. Such arrangements for accuracy have, however, been extremely rare in the history of the world. Where they are absent, egregious exaggerations have been made in estimates of the numbers of mankind; and in the absence of absolute facts, the best means of reducing these wild estimates to something reasonable was the skeptical philosopher's plan of comparing the estimate of the numbers with the probable amount of food at their disposal. The application of this check by Malthus was something like the application of chemistry to organic matter. He set himself to finding out how the relation of population to the means of sustenance could affect the future of the world. The result was appalling. The human race was found to increase at something like geometrical progression; while the fertility of land, by bringing in waste, and improving the methods of agriculture, only increased in something like an arithmetical proportion. Hence, if population were permitted to increase at its natural rate, it would soon overtake the means of subsistence. The theory had only one defect as applicable to the present condition of the world, that it overlooked the element of free trade. It involved a general pauperism to Britain if her people had no resource but the produce of her soil, but it made no allowance for the capacity of Britain to draw upon the fertility of the world at large. Malthus wrote other books, which got little notice in their day, and have been forgotten. He was appointed professor of political economy at the college of Haileybury in 1805. He filled his chair with great repute until his death, Dec. 29, 1836.

MAL'TON, a parliamentary borough and market t. in the North Riding of Yorkshire, on an elevation on the right bank of the Derwent, 18 m. n.e. of York. The parliamentary borough includes the parishes of Old Malton and Norton, to the former of which a grammar-school, founded in 1547, and having an annual endowment of £100 a year, is attached. There are also the remains of a priory, founded in 1150. Considerable trade is carried on. Pop. '71 of borough, which, since '67, returns but one member to parliament, 8,168.

Malton, called by the Romans *Camulodunum*, abbreviated by the Saxons into *Meldun*, was an important Roman military station, to which six ancient roads lead. After having been burned down, the town was rebuilt in the reign of Stephen, since which time it has been generally called New Malton.

MALT REFUSE, or MALT WASTE, is of two kinds: (1.) the *cornings* or small shoots and radicles of the germinated grain, which are separated before the malt is used by the brewer, often called *malt dust* and *kiln dust;* and (2.) the exhausted malt, after it has been

used by the brewer, called *draff*. Both are of use for the feeding of cattle, but the first kind is the most nutritious, being rich in nitrogenous substances which the brewer extracts from the malt used by him; draff, however, is advantageously employed, along with turnips, for the feeding of dairy cattle. Malt dust is also used as manure, chiefly as a top-dressing, and is very fertilizing and rapid in its effect.

MALU'RUS, a genus of Australian birds, giving its name to a large subdivision of the family *sylviadæ*, in which are contained many Asiatic and African species, and some that are natives of the s. of Europe. They have generally a long tail; in some, very long, as in the EMEU WREN of Australia, in which it is more than twice the length of the body, the shafts of its feathers loosely fringed on each side. The emeu wren (*stipiturus malachurus*) is a very pretty little bird, living chiefly among long grass. One of the most noted *maluri* is *M. cyaneus*, the BLUE WREN or SUPERB WARBLER of Australia, which is gorgeously attired in black, blue, white, and brown. It haunts scrubby brushwood.

MALUS, ETIENNE LOUIS, 1775–1812, b. Paris; educated at the school of military engineers, but falling under the suspicion of the revolutionary government, was dismissed. While serving as a private soldier at Dunkirk, he attracted the attention of Lepère, director of the fortifications there, who procured him an appointment to the *École Polytechnique*. Here he pursued the study of mathematics, and especially of the mathematical theory of optics. Appointed to the engineers, he entered the army of the Sambre and Meuse, and witnessed the passage of the Rhine, and the engagements at Altenkirch and Ukratz. He was attached to the Egyptian expedition, and after the capture of Jaffa, was engaged in the restoration of its fortifications, and the construction of military hospitals. He fortified Damietta, was present at the siege of Cairo, and after the surrender to the English, came back to France in 1801. He now took charge of the fortifications at Antwerp and Strasburg, at the same time carrying on his scientific researches. His *Traité d'Optique*, published in 1810, treats of the refraction and reflection of light, and contains experiments in regard to the reflection of light in transparent media. In 1808 the French institute offered a prize for the best paper on double refraction in crystals. Malus competed for this prize, and in the course of his experiments discovered the phenomenon known as the polarization of light. He advanced the theory that particles of light have poles, and that on entering a doubly-refracting crystal, some of the particles forming one of the rays may be so arranged as to be transmitted through it, while the particles which should have formed the other ray may be so arranged as to prevent the transmission in certain directions. The discovery of these phenomena introduced a new division of physical optics. Malus published an account of them in the *Memoirs* of the institute, which at once elected him to its membership; and the English royal society gave him the Rumford medal, though France and England were then at war. In 1810 he published his *Théorie de la Double Refraction de la Lumière dans les Substances Cristallisées*, and the next year he wrote a couple of papers on some phenomena of polarized light. He was appointed examiner in physics at the *École Polytechnique*, and was about to be appointed director of its studies when he died.

MALVA'CEÆ, a natural order of exogenous plants, of which about 1000 species are known, chiefly tropical, and most abundant in America, although the most important species belong to the old world. They are herbaceous plants, shrubs, and occasionally in tropical countries trees; with alternate entire or lobed leaves; the pubescence, if any, starry; the flowers showy, generally on axillary stalks; the calyx generally of five sepals or five segments, often with an epicalyx; the petals generally five, hypogynous, twisted in bud; the stamens numerous, united by their filaments; the ovary consisting of a number of carpels around a common axis, the styles generally five, the ovules few or many; the fruit dry or fleshy. The plants of this order have a great general similarity both in their appearance and in their properties and products. All of them contain a mucilaginous substance in great quantity, which is particularly abundant in the roots of the perennial herbaceous species. This mucilaginous quality makes some very useful as emollients and demulcents in medicine. The young foliage of some is used as a boiled vegetable. The seeds of all contain a considerable quantity of bland fixed oil. The inner bark of the stem often yields a useful fiber, for which species of *hibiscus* and *sida* are particularly valued; and to this order belong the cotton plants, so valuable for the fiber which envelops their seeds. Many of them are frequent ornaments of flower-gardens. See COTTON, HIBISCUS, HOLLYHOCK, MALLOW, MARSH-MALLOW, SIDA, and URENA.

MALVERN, GREAT, a t. and watering-place in Worcestershire, Eng., picturesquely situated on the eastern side of the Malvern hills, 8 m. s.w. of Worcester. The purity and abundance of the spring-water, and the facilities for healthful exercise afforded by the hills, have rendered Malvern a great resort for invalids following the hydropathic treatment, for which there are several large establishments. Pop. '71, 5,693.

MALVERN HILL, BATTLE OF, the last of the engagements known as the "seven days' battles," June 26–July 1, 1862, the others being those of Mechanicsville, Cold Harbor, Savage's station, and Frazier's farm. After the battle of Frazier's farm, McClellan posted the union army on Malvern hill, an elevated plateau about 1 m. from the James river, and 11 m. from Richmond. This hill is about a mile and a half in

length and three-quarters of a mile broad, flanked by thick woods, and faced with gullies, which rendered it exceedingly difficult of approach. The ground was thus exceptionally strong by nature, and it was now defended by McClellan's army of about 90,000 men; a battery of 7 heavy siege guns was placed on the crest of the hill, and the remainder of the union artillery was admirably posted in such wise that the concentrated fire of 60 guns could be directed at any point desired. Lee's army, which had persistently followed McClellan on his retreat to the James, attacking whenever it seemed practicable, had met with a serious repulse, June 30, but on the morning of July 1, with about 60,000 men, undertook to storm Malvern hill in the face of all the obstacles presented. The confederate attack was made by Jackson and D. H. Hill, and supported by Magruder, and, as might have been anticipated, resulted in their repulse, with a loss of 900 killed and 3,500 wounded. The union loss was 375 killed and 1800 wounded. McClellan did not take advantage of this success, but retired at once to Harrison's landing. The confederates continued to hold their lines for several days, when they retired to Richmond. See CHICKAHOMINY.

MALVOISINE, or MAWMOISINE, WILLIAM DE, a Scottish ecclesiastic; was educated (and as some think, born) in France. Going to Scotland, he was made one of the *clerici regis*, and archdeacon of St. Andrews. In 1199 he was constituted chancellor of Scotland; in 1200, bishop of Glasgow; in 1202, of St. Andrews; in 1208 he dedicated the new cemetery at Dryburgh abbey; in 1211 he and Walter, bishop of Glasgow, by appointment of the pope, convened at Perth a great council of the clergy and people, to press upon the nation the pope's will and command that an expedition be undertaken to Palestine. In 1214 he attended the coronation of king Alexander II., and is said to have placed the crown on his head. The following year he went with the bishops of Glasgow and Moray, and Henri, abbot of Kilso, to the fourth Lateran council, remaining abroad until 1218. He brought from the continent various orders of monks and mendicants before unknown in Scotland, and established convents of black friars at several places. He wrote lives of the saints Ninian and Kentigern. He was exceedingly zealous for the church. He insisted earnestly also on his own rights, for at one time he deprived the abbey of Dunfermline of the presentation to two churches, because the monks had failed to provide him wine for supper. Fordun says the monks had provided wine, but that the bishop's attendants had drunk it all up. He continued bishop of St. Andrews till his death.

MAL'WA, a former kingdom of India, lying for the most part n. of the Nerbudda, and s.w. of the valley of the Ganges, is an uneven plateau varying from 1500 to 2,500 ft. above sea level. It is now divided into a number of protected states.

MAME, ALFRED HENRY ARMAND, b. Tours, France, 1811. Inheriting the publishing house of his father, of which he has become sole conductor; he has increased it to a vast establishment, employing 700 workmen in its factories, and nearly as many more outside, printing and binding upwards of 20,000 volumes per day. Religious books formerly composed a large part of its work, but works on law have been added. The *Bibliotheque de la Jeunesse Crétienne*, an aggregate of little volumes for distribution in Sunday and secular schools, and primary school-books make the greater part of the publication of the house of Mame. Of late years, however, they have published elegantly illustrated works in other fields; as, *Les Jardins; La Sainte Bible*, illustrated by Doré; and *Les Chefs d'Œuvre de la Langue Française*. In 1773 he received one of the prizes of 10,000 francs accorded to the manufacturing establishments where there was found the greatest social harmony and well-being among the workmen, which was given for his establishment at Tours.

MAM'ELON (Fr. from Lat. *mamma*, breast), a mound in the shape of a woman's breast. These artificial mounds of fortifications were common in the siege of Sebastopol.

MAMELU'CO, the name given in parts of South America to a child of a negro father and an Indian mother.

MAM'ELUKES, MAMLOUKS, or MEMLOOKS, an Arabic word signifying *slaves*, the name given in Egypt to the slaves of the beys, brought from the Caucasus, and who formed their armed force. When Genghis Khan desolated great part of Asia in the 13th c., and carried away a multitude of the inhabitants for slaves, the sultan of Egypt bought 12,000 of them, partly Mingrelians and Tcherkesses, but mostly Turks, and formed them into a body of troops. But they soon found their own power so great that, in 1254, they made one of their own number sultan of Egypt, founding the dynasty of the Baharites, which gave place to another Mameluke dynasty, that of the Borjites, in 1382. The Causasian element predominated in the first dynasty, the Tartar element in the second. In general, they formed able and energetic rulers, and Egypt under their sway arrived at a degree of prosperity and power to which she had been a stranger from the days of Sesostris. Selim I., who overthrew the Mameluke kingdom in 1517, was compelled to permit the continuance of the 24 Mameluke beys as governors of the provinces. This arrangement subsisted till the middle of the 18th c., when the number and wealth of the Mamelukes gave them such a preponderance of power in Egypt that the pasha named by the porte was reduced to a merely nominal ruler. The number of them scattered throughout all Egypt was between 10,000 and 12,000 men. Their number was kept up chiefly by slaves brought from the Caucasus, from among whom the beys and other officers of state were exclusively chosen.

Their last brilliant achievements were on the occasion of the French invasion of Egypt, and during the time immediately following the retirement of the French. At this time Murad Bey stood at their head. But in 1811 they were foully massacred by Mohammed Ali (q.v.), afterwards viceroy of Egypt.

MAMERS, a small t. of France, in the department of Sarthe, 25 m. n.n.e. of Le Mans. Coarse linens, calico, beer, and leather are manufactured. Pop. '72, 5,063.

MAMIANI, Count TERENZIO, an Italian philosopher, statesman, and writer, b. in 1801, at Pesaro. Having taken a prominent part in the futile revolutionary outbreak which accompanied the accession of Gregory XVI., Mamiani was compelled to seek safety in flight, and repaired to Paris, from whence he promoted with energy the revolutionary tendencies of his country. In 1846, on the accession of Pius IX., he declined the proffered papal amnesty, as long as its acceptance involved a disavowal of his former political principles; but on its being unconditionally granted, he availed himself of it, and even formed part of the papal ministry on the promulgation of the constitution. The inconsistent policy of the pope having compelled him to resign his post, he withdrew to Turin, where he founded, with Gioberti, a society for promoting the union of Italians. On the flight of Pius IX. from Rome to Gaeta, he re-entered the political arena, and was for a short period foreign minister in the revolutionary cabinet of Galetti. On the fall of Rome he retired to Genoa; in 1856 he was returned member of the Sardinian parliament, and in 1860 entered Cavour's ministry as minister of instruction. He was appointed ambassador to Greece in 1861, to Switzerland in 1865. His chief works are: *Del Rinnovamento della Filosofia antica Italiana* (1836); *Poeti dell' età Media* (1842); *Dell' Ontologia e del Metodo; Principi della Filosofia del Diritto*, and a number of treatises on various subjects. In 1870 he became editor of a new quarterly review, *Filosofia delle Scuole Italiane*.

MAMMA'LIA (Lat. *mamma*, the breast), the highest class of the animal sub-kingdom *vertebrata* (q.v.). This class includes man and all the animals which resemble him in the most important points of their organization; and it is naturally placed at the head of the animal kingdom because (independently of man being a member of it) it contains the animals which manifest the highest degree of intelligence, and which possess the most complex organization.

The most distinctive character of the mammalia is their mode of development and of nourishment during the earliest period of life. They are all brought into the world alive (viviparous), not merely, as in certain (ovo-viviparous) reptiles and fishes, by the retention and hatching of the egg within the oviduct, but by the formation of a new connection between the embryo and its mother, while the former lies within the maternal cavities, so that provision is made for its development before birth, not, as in birds, etc., by the large yelk (see DEVELOPMENT OF THE EMBRYO), but by a constant supply of nutriment direct from the maternal blood. In mammals, the ovum on quitting the ovary is of extremely minute size, and the materials of the yelk only serve to support the embryo during its very earliest period. After undergoing certain changes in the passage through the Fallopian tube or oviduct, which it is unnecessary here to notice, the ovum reaches the uterus or womb, and connects itself by a set of root-like tufts of vessels with the maternal vessels. These tufts absorb from the mother's blood the ingredients necessary for the support of the embryo, while they convey back to it the effete particles of the embryonic tissues. Through this organ, which simultaneously increases in size with the embryo, and is named the placenta, the young animal, except in the lowest orders of the class—viz., the marsupialia (q.v.) and the monotremata (q.v.)—derives its nutriment during the whole period of gestation (q.v.); while in the two orders just named no vascular connection of the ovum with the uterus of the mother is formed, the ovum being simply retained for a time within the uterus, and the requisite nourishment for the development of the young animal being obtained by absorption through the membranes of the ovum. This remarkable difference in the development of the mammalian embryo has given rise to a division of this class into two great sections or sub-classes—the *placental* and the *implacental* (or *aplacental*) mammals. In both sub-classes we find the same provision for nourishing the animal during the period immediately succeeding its birth—viz., the milk (q.v.), a fluid secreted by peculiar glands, called the *mammary glands*, which become greatly developed in the female during the periods of gestation and lactation; and as this is found in no other class, it is the character by which the entire group is most positively defined, and from which it derives its name.

The mammary gland exists in both sexes, but except in very rare cases, it is only in the female that they secrete milk. Their number is never less than two, and when more, is generally nearly proportional to that of the young produced at each birth. In the monkey, the elephant, the goat, the mare, etc., there are two; in the cow, stag, and lion, four; in the cat, eight; in the rabbit, ten; in the pig, generally twelve; and in the rat ten or twelve. These glands are often blended together, as in the cow; and their number is then indicated externally by that of the nipples or teats. Their position also varies; in the monkeys and bats, and in the herbivorous cetacea, they are situated on the thorax, as in man; in most of the carnivorous animals they are situated on the abdomen as well as on the thorax; while in the mare, cow, sheep, etc., they are placed still further back, near the hip-joint.

The *skin* in the greater number of mammalia is covered with hair, a form of tegumentary appendage peculiarly characteristic of this class. In the cetacea, however, we have an almost entire absence of hair; one of its uses—that of keeping the heat within the body—being here provided for by the thickening of the skin and the deposition of the blubber beneath it. In the edentata, the hairy covering is almost entirely replaced by horny scales, as in the scaly ant-eater, or by bony plates, as in the armadillo. In the quills of the porcupine and the spiny bristles of the hedgehog, we have other modifications of hair which depart less from its ordinary character than those just mentioned. Moreover, the claws, nails, and hoofs of all mammals, the horn or horns on the nose of the rhinoceros, and the horns of the hollow-horned ruminants (such as the ox, sheep, etc.), are all composed of a substance which is only a modification of hair.

The *skeleton*, as a general rule, governs the general form of the body. In its general conformation, it shows a close analogy with that of man, which is described in the article SKELETON; the differences which are remarked among the various animals of this class mainly depending (1) upon the absence of posterior limbs in the marine mammals, such as the dugong, the porpoise, and the whale; (2) upon the diminished number of digits (see HAND and FOOT), and upon the absence of the clavicle in the greater number of those species whose anterior limbs serve only for motion; (3) upon variations in the number of vertebræ; and (4) upon the inequalities in the relative sizes of the same bones (Milne-Edwards).

Although the same bones enter into the formation of every mammalian skull, great differences present themselves in different skulls, according as the face is more or less prolonged, or, on the other hand, the brain-case or cranium is more or less developed. In proportion as a mammal is removed in classification from man, we find that the cranium is diminished; that the face is prolonged by extension of the jaws and nasal cavities; that the orbits are directed outwards, and are less distinct from the temporal fossæ; and that the occipital foramen (through which the spinal cord passes) and the condyles (by which the head articulates with the first vertebra of the spinal column) are placed towards the posterior part of the skull, instead of occupying the middle of its inferior surface, as in man. Among the most characteristic points in the mammalian skull generally may be mentioned (1) that the lower jaw articulates directly with the skull, there being no intervening tympanic bone, such as occurs in the other vertebrates; and (2) that the occipital bone of the skull articulates with the first vertebra by two condyles, one on either side of the occipital foramen, instead of by a single condyle, as in the other vertebrates.

The *vertebral column*, except in relation to its length, closely resembles that in man, where there are 7 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 5 caudal vertebræ. The *cervical vertebræ* are almost universally 7 in number, however long or short the neck may be, the only known exceptions being two cetaceans (*manetus* and *rytina*), which have 6, and the three-toed sloth, which has 9. The number of *dorsal vertebræ* ranges from 11 to 23, which latter number occurs in the two-toed sloth. The *lumbar vertebræ* range from 2 to 9, the most common number being 5. The *sacral vertebræ*, which coalesce to form the sacrum and to support the pelvic arch, vary from 2 (in the monotremata and marsupialia) to 6 (in the mole), the most common number being 4. In the cetacea, the rudimentary pelvis is loosely connected with a single vertebra, and there cannot be said to be a sacrum. The *caudal vertebræ*, which in man and the higher apes coalesce to form the *coccyx*, are usually very numerous, 20 or 30 being a common number, and 40 occurring in the long-tailed ant-eater. The form and number of *caudal vertebræ* vary in accordance with the purposes to which the tail is applied; and the special uses of this organ are numerous. For example, in the kangaroo it serves as a third leg when the animal stands erect; in the American monkeys, and in some of the opossums, it is a prehensible organ; and in the cetacea and in the beaver it is a powerful instrument of propulsion in water. The *ribs* correspond in number to the dorsal vertebræ, and, as a general rule (excepting in the monotremata), they are connected superiorly not only with the bodies of two vertebræ, but with the transverse process of one of them, and hence present corresponding articular surfaces. The *sternum* is generally divided into three portions; the middle one, in place of being represented by a single piece, as in man, usually consisting of as many pieces as there are true ribs. It is very short in the cetacea, and is very long in the carnivora and edentata, extending in some cases nearly to the pelvis. In certain cases, in which it is necessary that the anterior members should be endowed with unusual strength, as in the bats, moles, and armadillos, there is a projecting keel upon this bone (as in birds) for the attachment of powerful pectoral muscles.

The cavity of the *thorax*, which is bounded superiorly by the dorsal vertebræ, laterally by the ribs, and inferiorly by the sternum, is completely separated from the abdominal cavity in mammals (but in no other vertebrates) by the muscular septum known as the *diaphragm*, or midriff.

The *scapular arch* in mammals is comparatively imperfect, its coracoid element (see CORACOID BONES) not being sufficiently developed, except in the monotremata, to reach the sternum, or to meet its fellow in the mesian line. Where the scapula has any bony connection with the sternum, it is through the clavicle or collar-bone, which is frequently absent. The *pelvic arch* is always composed of the ilium, ischium, and pubis on either

side, and these bones generally coalesce together, as in man, at an early period of life; but in the monotremata they remain separate. In the implacental mammals (the monotremata and marsupialia), the pelvis presents this striking peculiarity, viz., that from the symphysis (or mesial line of union) two additional bones, termed the marsupial bones, project forwards and outwards, one of whose functions is to support the *marsupium*, or pouch, which is characteristic of the female marsupials. In the bat, the pelvis is greatly elongated, and the bones do not unite in the mesial line to form a symphysis, so that the lower part remains open, as in birds; while in the cetacea, which have no posterior limbs to be supported by the pelvis, that organ is extremely rudimentary or even entirely absent. As a general rule, the pelvis of mammals is never so broad as in the human subject, and its lateral walls are always relatively smaller, flatter, and longer.

The *anterior extremities* are always present, although their modes of conformation are very varied, according to the purposes for which they are designed; and the *posterior extremities*, which are also always present, except in the cetacea, closely resemble the anterior; the difference being greater in man than in any other case, in consequence of the special adaptation of the pelvic extremities for the support of his body in an erect position. The ordinary modifications of these organs are described in the articles HAND and FOOT.—See Owen *On the Nature of Limbs*.

The *teeth* of mammals constitute so characteristic a feature in their organization, and are of so much service in their classification, as to require a special notice. The only animals of this class in which teeth are altogether absent are the true ant-eaters and the monotremata. The number of teeth is generally much more restricted than in reptiles or fishes. In most mammals it is the same as in man—viz., 32; but the typical number, according to Owen, is 44. The largest number of teeth occurs in the armadillos (in one species of which are 98 simple molars), and in the dolphins, which have from 100 to 190 teeth. When the teeth are in these excessive numbers, they are small, nearly equal, and usually of a simple conical form, but excepting in these cases, most mammals have particular teeth for special purposes; thus, the front teeth, from being commonly adapted to effect the first coarse division of the food, are called cutters, or *incisors;* and the back teeth, which complete its comminution, grinders, or *molars;* while the large conical-pointed teeth (of which there is never more than one in each half jaw), which are specially adapted for holding the food while the animal tears it asunder, are called holders, laniaries, or more commonly *canines*, from being well developed in the dog. The incisors and canines may be absent, but except in the cases previously mentioned, the molars are always present. The mode in which the teeth are implanted in the jaw is characteristic of the class. Excepting in those teeth which grow from persistent pulps (as the front teeth of the rodents, for example), the dental cavity is closed in at its extremity, and the tooth is prolonged into a fang, which is implanted in a socket lined by periosteum, to which the exterior of the fang is firmly adherent; there being never a continuous ossification or anchylosis of the tooth to the jaw. Again, the fang of the molars is usually divided into two, three, or even four divergent processes, and there is no known fish or reptile in which even a bifid fang occurs. Teeth are confined in this class to the maxillary, pre-maxillary, and lower maxillary bones, and form only a single row in each; and, in general, teeth are situated in all these bones. In all existing mammals, except man, there is a vacant space between the incisor and canine teeth. No mammal has more than two sets of teeth; most, however, have two; the first, which are called temporary, deciduous, or milk teeth, being displaced, and succeeded by the permanent teeth. For a description of the structure and principal forms of these organs, we must refer to the article TEETH, and to prof. Owen's magnificent *Odontography*.

The *digestive apparatus* (of which the teeth may be considered a portion) acquires its greatest completeness and elaboration in this group. The leading differences which it presents, and which depend mainly on the nature of the food, have been already noticed in the article DIGESTION.

The *organs of circulation and respiration* require no special remark, as, in all essential points, they closely resemble the corresponding organs in man. See CIRCULATION and RESPIRATION.

The *kidneys* of mammals generally agree with those of man in their internal structure. See KIDNEYS. In some animals (especially those that live in water), they are much lobulated. In the ox, there are 20 free rounded lobules; in the bear, 40 or 50; in the seal, 70 or 100; while in the true cetacea, the separate lobules are so numerous as to give a racemiform appearance to the kidney. All mammals are provided with a urinary *bladder*, in which the excretion may accumulate so as only to require being discharged at intervals. This organ is largest in the herbivora, and very small in the cetacea.

The *nervous system* is remarkable for the large size of the brain, and especially of its hemispheres, in comparison with the rest of the nervous system. The surface of the cerebral hemispheres exhibits a more or less convoluted appearance, the number of the convolutions being to a great degree in correspondence with the amount of intelligence of the animal. The hemispheres are united at their lower parts (except in the implacental mammals) by a fibrous band or commissure, termed the *corpus callosum*, which does not occur in the other vertebrates. In the lowest mammals, the cerebellum is situated quite behind the hemispheres, so as to be visible from above; as we get higher in the scale, it is more

or less covered, in consequence of the prolongation of the hemispheres backwards; until in the highest apes and in man it is almost completely concealed.

The *organs of the senses* are constructed on precisely the same plan as in man. The most important variations are noticed in the articles EAR, EYE, etc.

The *muscular system* generally accords with that of man, but presents many remarkable deviations, according to the form of the skeleton, the use of the several organs in the act of locomotion, the natural posture of the animal, etc.

From the structural characteristics and peculiarities of mammals, we turn to that class of animals in their relations to man.

The *uses* to which mammals are subservient are almost innumerable, and will readily suggest themselves.

Mammals are very generally distributed over the surface of the globe. The mammalia of certain regions evince very decided peculiarities of structure and distribution, as is well exemplified by the case of the two lowest or *implacental* orders—the *monotremata* and *marsupialia*, both of which (with the sole exception of the opossum, one of the *marsupialia*, in America) are confined to the Australian province. Many other facts of equal interest in the distribution of mammals will be readily ascertained in Mr. A. R. Wallace's *Geographical Distribution* (1876).

The subdivision of the mammals into these orders closely approximates to that of Cuvier, as may be seen by a reference to the following table of his sub-classes and orders of the mammalia:

		Order.	Family or Genus.	Example.
UNGUICULATA,	With three kinds of teeth,	BIMANA,	*Homo*,	Man.
		QUADRUMANA,	*Catarrhina*,	Ape.
			Platyrrhina,	Marmoset.
			Strepsirrhina,	Lemur.
		CARNARIA (the CARNASSIERS of Cuvier,	*Cheiroptera*,	Bat.
			Insectivora,	Hedgehog.
				Shrew.
				Mole.
			Carnivora,	Bear.
				Dog.
				Seal.
		MARSUPIALIA,	*Didephys*,	Opossum.
			Phalangista,	Phalanger.
			Macropus,	Kangaroo.
			Phascolomys,	Wombat.
	Without canines,	RODENTIA,	*Claviculata*,	Rat.
			Non-claviculata,	Hare.
	Without incisors,	EDENTATA,	*Bradypus*,	Sloth.
			Dasypus,	Armadillo.
			Myrmecophaga,	Ant-eater.
			Monotremata,	Echidna.
				Ornithorhynchus.
UNGULATA,		PACHYDERMATA,	*Proboscidea*,	Elephant.
			Ordinaria,	Hog.
				Tapir.
			Solidungula,	Horse.
		RUMINANTIA,		Sheep.
MUTILATA,		CETACEA,	*Herbivora*,	Dugong.
			Ordinaria,	Whale.

This classification is given in the present article because, although imperfect in many respects (for example, in placing the sloth above the horse, the bat above the dog, and the hedgehog above the elephant), it has been retained in a large number of popular works. In consequence of these obvious imperfections, subsequent attempts at new classifications have been made by several of the most eminent zoologists, some of whom, as Waterhouse and Owen, have taken the brain, and others, as Milne-Edwards, Gervais, and Vogt, the placenta, as the basis of classification. Our limited space forbids us from discussing the merits of these systems. The grounds on which prof. Owen bases his cerebral classification may be found in his essay *On the Classification and Geographical Distribution of the Mammalia*, 1859; while the arguments in favor of the placental classification may be found in prof. Huxley's lectures on classification, published in the *Medical Times* for the year 1863.

Fossil Mammalia.—The remains of mammalia are generally found in a fragmentary condition; but there is a valuable compensation to the student of these higher organisms, for in them the parts are so differentiated that the smallest fragment—a tooth or a bone—often tells more to the comparative anatomist than the complete skeleton of some of the lower classes.

No relics of mammalia have been detected in the palæozoic rocks, the earliest we are acquainted with belong to secondary strata. These are the remains of *microlestes* from the Keuper, unless the jaws of the *dramatherium* from an American coal-bed, which is probably of triassic age, be older. The *microlestes*, of which the teeth only have been found in Germany and in Somerset, is considered by Owen to have been allied to the small marsupial and insectivorous *myrmecobius* of Australia. The next remains of this class have been found in the Stonesfield slate, a member of the oolite. They consist of teeth and lower jaws, which have been referred to four genera, three of which are thought to have been marsupial insectivora, while the other (*stereognathus*) was a placental mammal, probably a hoofed, and consequently a herbivorous animal, allied to the eocene

hyracotherium. Mr. Beckles has recently found the remains of twelve or thirteen species belonging to eight or nine genera of mammalia—placental and marsupial—in the Purbeck beds, the newest of the oolites. The great series of the chalk formations has hitherto yielded no mammalian fossils. We are certainly acquainted with only a small fraction of the mammals of the secondary measures. When more continued and careful research is made, greater results must follow. Mr. Beckles recently uncovered 22 yards square of the very thin dirt-bed of the Purbeck, from which previously the remains of only a single species had been obtained, and this very limited space yielded up to him the remains of no less than twelve or thirteen new species.

As we rise through the tertiary deposits, the number of mammalia greatly increase. Nearly 50 species were described by Cuvier from the eocene strata of the Paris basin; and since his time, numerous additions have been made by Owen and others. They are chiefly pachyderms, belonging to the genera *palæotherium, anoplotherium, hyracotherium*, etc.; but with them are associated the remains of an opossum and of several carnivorous animals. Not only do the number of species increase in the miocene beds, but they represent a larger number of orders. There have been discovered two monkeys, numerous proboscidian pachyderms, as the *dinotherium, mastodon*, and *elephant*, two or three cetaceans, an enormous ant-eater, and several carnivora. The fossils of the pleiocene and pleistocene beds are still more numerous, and represent a race of animals not unlike the living fauna, but generally of a gigantic size. The elephants, elks, and bears of Europe were the contemporaries of immense sloths and armadillos in South America, and of huge kangaroos and birds in Australasia. Associated with the bones of some of these extinct species have been found flint implements, and even the bones of man, but under circumstances that have caused great difference of opinion among observers as to their true age. See MAN.

MAM'MARY GLAND, ANATOMY OF. See BREAST.

MAMMARY GLAND, DISEASES OF. The following are some of the most important of these affections.

Acute inflammation of the breast, which is characterized by great swelling, tenderness, pain, and fever. There is a knotty feeling in the inflamed part, and matter soon forms; but the abscess is often slow in pointing. The affection may occur at any period of lactation, and sometimes arises from very trifling causes—as a loaded state of the bowels, too stimulating a diet, etc. The bowels should at once be cleared out by sharp purgatives; leeches and fomentations should be applied; the arm on the affected side should rest in a sling; and an opening should be made where matter can be felt. The milk should also be regularly drawn off, if it can be done without extreme pain.

Sore nipples are a frequent cause of the preceding disease. Among the remedies for excoriations, cracks, fissures, and ulcerations of the nipple which cause great pain in suckling, are the application of strong astringent lotions (tannin lotion, for example), touching the sore point with solid nitrate of silver (lunar caustic), and especially the application of collodion. In bad cases, a metallic shield must be placed on the nipple, to protect it from the clothes and from the child's mouth. The regular application of a liniment of rectified spirits and olive oil in equal parts will sometimes prevent this affection.

The mammary gland is also liable to hydatid disease (see HYDATID), to the morbid growth known as chronic tumor, serocystic disease, or glandular tumor, etc., and to cancer (q.v.).

MAMMEE APPLE, *Mammea Americana*, a highly esteemed fruit of the West Indies (where it is sometimes called the *wild apricot*) and tropical America. It is produced by a beautiful tree of the natural order *guttiferæ*, 60 to 70 ft. high. The fruit is roundish, from the size of a hen's egg to that of a small melon, with a thick leathery rind, and a very delicate inner rind adhering closely to the pulp, which must be carefully removed on account of its bitter taste. The pulp is firm and bright yellow, with peculiar sweet and very agreeable taste, and a pleasant aromatic odor. A similar fruit is produced by *mammea Africana*, an African species.

MAM'MOLA, a t. of south Italy, in the province of Reggio, 7½ m. from Gerace. It stands in a beautiful and fertile district on the Locano. Pop. '72, 7,804.

MAMMON, a Chaldee word denoting riches, and so used often in the Chaldee Targums and in the Syriac version. This meaning is given by Tertullian, Jerome, and Augustine; and so Christ employs it in Luke xvi. 9, 11, but Christ uses it also as a personification of the god of riches, as, "Ye cannot serve God and mammon." The derivation of the word is doubtful.

MAM'MOTH, the Russian name for the fossil elephant, whose remains are so common in the recent deposits of northern Europe. For a description of it, see the article FOSSIL ELEPHANT. The name is sometimes erroneously given to the mastodon.

MAMMOTH CAVE, the largest known cavern in the world, is in Edmonson co., Ky., near Green river, 130 m. s.s.w. of Lexington, on the road to Nashville. It consists of a series of caverns, and has been explored to a distance of 10 miles. In this cavern there

is a river crossed by a boat, and various eyeless animals are found, among others the "blind fish" (*amblyopsis spelæus*). Stalactites hang from the limestone rocks, and the earth is rich in niter. The equable temperature and nitrous atmosphere of the cavern having been recommended as a remedy for diseases of the lungs, a hotel was built in one of the larger chambers of the cave, for the accommodation of consumptive and asthmatic patients; but the use of it has been long discontinued. There are many circumstances to prove that the Mammoth cave is part of the course of a subterranean river which existed in a former condition of the surface.

MAMMOTH CAVE (*ante*), though the largest, is but one of a very large series of caves, lying beneath extensive districts of both Tennessee and Kentucky. It was discovered in 1809, and has always been private property. The principal stream, Echo river, is nearly three-quarters of a mile in length and has underground communication with Green river; the Styx is about 450 ft. long and is remarkable for a natural bridge of great beauty. Passages and avenues connect chambers or halls, placed at different levels; thus showing the slow progress of the stream in its course through the earth. Accurate measurement of the passages has never been permitted. The extreme length is said to be from 8 to 10 m., while the total length of passages cannot be less than 150 miles. Several of the largest chambers, called domes, extend through the entire height of the levels. Of these the most notable are the Stella, Mammoth, and Gorin's domes, each about 250 ft. high, and Lucy's dome, over 300 ft. high and 60 ft. in diameter. Cleveland avenue extends for more than 2 m. and presents a most wonderful variety of crystals and incrustations, "some massive and splendid; others delicate as the lily."

All of the halls offer to view numbers of stalagmites and stalactites, which in their varied and fantastic shapes—sometimes exhibiting weird or grotesque resemblance to natural or architectural objects—form, in conjunction with the streams and fountains, the picturesque scenery of the cavern. Startling effects are produced by the use of lights and fireworks, the Star chamber showing on its ceiling myriads of the glistening points from which it takes its name.

Geologists assign a million years as the approximate term for the production of this series of caves. There is at present no growth, but, on the contrary, a slow but continual decrease in size by the natural causes of decay and accretion. The process of formation seems to have been as follows: In their course through the soil the streams absorb a large amount of carbonic acid gas; this possesses the chemical power of taking up considerable quantities of carbonate of lime, thus by varied action forming large cavities, and depositing the carbonate, in part, on ceiling or floor or in the stalagmite and stalactite forms, and, in part, carrying it off into the river. In this way the caverns are in succession produced and closed up.

The variations in both the insect and fish life of the Mammoth cave from the ordinary type are scientifically of the highest interest as bearing upon and, it is claimed, favoring the doctrines of evolution and natural selection. That variation has taken place to accommodate animal life to exigencies of environment cannot be doubted, when we examine the blind and the totally eyeless species of fish and crawfish here found. It is not improbable that, if more thoroughly explored, fossil testimony of great value might be discovered

MAMUN, ABU'L ABBAS ABDALLA AL, Caliph of Bagdad, of the Abbaside dynasty, and son of Haroun al-Raschid, was b. in Bagdad, 786, and brought up along with his brothers under the care of the most illustrious men of the time. In 800 A.D. he was invested with the government of Khorassan; and after dispossessing his elder brother, Al-Amin, who had ascended the throne on the death of their father, became caliph, Oct. 4, 813. His reign was disturbed by internal dissensions, and rebellions of the outlying provinces. Africa and Yemen declared themselves independent, the subjection of Egypt, Syria, and Mesopotamia was merely nominal, but the rest was well and beneficently governed. Civilization advanced with rapid strides; ruined towns and devastated tracts were restored; and distributions from the royal treasury made to those who had suffered from earthquakes, drought, or any other unavoidable cause. In 827, Mamun abjured the orthodox religion, and joined the heterodox sect called Motasalis, compelling a number of his subjects to follow his example. Towards the close of his reign, a war broke out with the Greek emperor Theophilus, and soon afterwards Mamun died, Aug. 9, 834. Mamun was the most learned and liberal of the Abbaside caliphs, and is said to have expended 300,000 dinars (£137,500) on the translation of the works of the ancient Greek philosophers into Arabic, these works having been presented to him by the Byzantine emperor. He highly encouraged mathematics and astronomy, founded observatories at Bagdad and Kasiun (near Damascus), caused a degree of latitude to be measured, and the obliquity of the ecliptic to be estimated. His new city of Bagdad became the abode of men of science and letters, who flocked to it from all quarters; and Mamun himself personally superintended their labors. Mamun has left three works, two of which are on religious subjects

MAN. Under this heading, it is proposed to consider various topics relating to the physiology and natural history of man, which have not been treated of in independent

articles, such as the development of the physical qualities of man, the distinctive characteristics of man, and the antiquity of the human race. The question of the races or varieties of man has been already discussed in the article ETHNOLOGY; and for information regarding the mental and social nature of man, the reader is referred to the articles ETHICS, INSTINCT, INTELLECT, MIND, etc.

In tracing the development of the physical qualities, we shall follow the arrangement pursued by Quetelet in his celebrated treatise *Sur l'Homme*.

It is a very remarkable fact, the true causes of which we do not know, that more boys are born annually than girls. Taking his data from the principal European states, M. Bickes (quoted by Quetelet), who has collected more than 70,000,000 of observations, finds that in Europe generally 106 males are born to 100 females. In Great Britain, the ratio is not quite so high, being 104.75 to 100. To some extent, the age of the parents influences the sex of the children, and Mr. Sadler was led to the conclusion, that "the ratio in which the sexes are born is regulated by the difference of age of the parents, in such a manner that the sex of the father or the mother will preponderate beyond the average of the total number of births, according to the party which has the excess of age."

The probable value or duration of life immediately after birth is, in general, about 25 years in Belgium (Quetelet), 32.2 in France, 33 years in England (Rickman), and 47.2 in Geneva (Lombard). Towards the age of five years, the chances of prolonged life for both sexes is greatest, ranging from 48 to 50 years. It is impossible to state with scientific precision what is the natural length of a man's life, when all abnormal disturbing causes are removed; but so few persons exceed the age of 100 years that a century may be taken as the limit of man's existence.

The development of the height, weight, and strength, at different ages, has been studied by Quetelet, J. D. Forbes, Danson, and others. From a large number of observations made by Quetelet in Belgium, he deduces the following conclusions:

1. From birth there is an inequality both in weight and height between children of the two sexes: the average weight of a boy at birth being 3.20, and that of a girl 2.91 kilograms (1 kilogram=2.2 lbs.); the height of a boy being .496, and that of a girl .483 meters (1 meter=3.28 ft.). 2. The weight of a child diminishes slightly towards the third day after birth, and does not begin to increase sensibly until after the first week. 3. At equal ages, the boy is generally heavier than the girl. It is only at about the age of 12 that the individuals of both sexes are of the same weight. Between 1 and 11 years the difference in weight ranges from a kilogram to a kilogram and a half; between 16 and 20, it is nearly 6 kilograms; and after this period, 8 to 9 kilograms. 4. When man and woman have attained their full development, they weigh almost 20 times as much as at birth; while their height is about $3\frac{1}{4}$ times greater than it was at that period. 5. In old age, man and woman lose about 6 or 7 kilograms in weight, and 7 centimeters in height. 6. Man does not acquire his complete growth till after he has completed his 25th year; he attains his maximum weight at 40, and begins to waste sensibly after his 60th year. 7. Woman attains her maximum weight at the age of 50. During her reproductive period, the increase of her weight is very slight. 8. The weight of individuals who have been measured, and who were fully developed and well formed, varies within extremes which are nearly as 1 to 2; while the height varies within limits which at most are as 1 to $1\frac{1}{5}$, as may be seen from the following observed values:

	Maximum.	Minimum.	Average.
Weight of man	98.5 kilog.	49.1 kilog.	63.7 kilog.
" woman	93.8 "	39.8 "	55.2 "
Height of man	1.890 meters,	1.476 meters,	1.684 meters
woman	1.740 "	1.408 "	1.579 "

Quetelet instituted a series of experiments on the strength of persons of both sexes at various ages. He determined both the lumbar power (the weight that could be carried on the back) and the power of the hands by means of Regnier's dynamometer.

From his tabulated results, it appears that the lumbar power of females differs less from that of males during childhood than subsequently. During childhood, the lumbar power of boys is about one-third more than that of girls; towards the age of puberty, one-half; while in adult life it is more than twice as great. The average strength of a well-developed man is 89 kilograms, or nearly 19 kilegrams more than his weight in his dress, so that such a man might hold on for a short time by a rope with a weight of 19 kilograms attached to his body. From experiments on the power of the hands, it appears that the manual power of the male sex is greater than that of the female at all ages. Before puberty, the ratio is 3 to 2, and it afterwards becomes 9 to 5. It also appears that the hands acting together produce a greater effect than the sum of the effects they produce when acting singly; and that the right hand is about one-sixth stronger than the left.

Principal Forbes made a series of experiments on English, Scotch, and Irish students, which, in most respects, are strongly confirmatory of Quetelet's results, but which evince the superior development of the natives of this country, especially in strength. The following numbers are selected from Forbes's tables:

WEIGHT IN POUNDS, INCLUDING CLOTHES.

Age.	English.	Scotch.	Irish.	Belgians. (Quetelet.)
16	127	125.5	129	117.5
20	144	146.5	148	143.0
24	150	152.0	155	149.5
	HEIGHT IN INCHES, INCLUDING SHOES.			
16	66.5	66.8	...	64.2
20	68.7	69.1	69.8	67.9
24	68.9	69.3	70.2	68.2
	STRENGTH IN POUNDS.			
16	336	314	...	236
20	385	392	416	310
24	402	421	431	337

If we proceed to compare the human figure with that of the animals which in their form approximate most closely to man (viz., the anthropoid apes), the chief point that strikes us is the great relative size of the human brain-case and brain, and the comparatively small size and vertical direction of the face; the great length and muscularity of the lower extremities, and their adaptation to the erect position; the adaptation of the hand to the great variety of actions of which it is capable, due mainly to the fact, that the thumb can be opposed to the extremities of all the fingers, whether singly or in combination; the greater breadth of the pelvis, etc.

Those, however, who are inclined to support Mr. Darwin's hypothesis, maintain, that whatever system of organs be studied, the comparison of their modifications in the ape series leads to one and the same result—that the structural differences which separate man from the gorilla and the chimpanzee are not so great as those which separate the gorilla from the lower apes. This by no means implies that the structural differences between man and the highest apes are small and insignificant; it is admitted, on the contrary, "that they are great and significant; that every bone of the gorilla bears marks by which it might be distinguished from the corresponding bone of a man; and that, in the present creation, at any rate, no intermediate link bridges over the gap between *homo* and *troglodytes*.—Huxley.

The last point we shall notice is: When did man first appear upon the surface of the globe? All that can be definitely stated upon this subject is, that the geological researches of Boucher de Perthes, Falconer, Prestwich, sir Charles Lyell, and many others, show that while it is impossible to fix the date of man's appearance, or even to approximate to it, there is apparent evidence of his existence far beyond that which is assigned by our popular chronology. The flint implements which have been discovered in the lower gravels of Abbeville and elsewhere, have been already noticed in a special article, and their occurrence in association with the fossil bones of extinct mammals, and the other evidence of their antiquity deduced from their geological position, have been there described.

The Brixham caverns afford similar and corroborative evidence of the antiquity of man. They were discovered accidentally in 1858 by the roof of one of them falling in. Below a thick stalagmite crust, which formed their floor, and which contained some of the bones of the cave-bear, was a mass of loam of an ocherous red color, in some parts 15 ft. in thickness, in which were found remains of the mammoth, an extinct rhinoceros, the cave-bear, etc., and from various parts of these deposits flint-knives were obtained. Under the bone-deposit was a bed of gravel, which in some parts was more than 20 ft. thick. It contained no fossils, but even in its lowest parts were found specimens of flint knives. The fabricators of these knives must have lived long antecedently to the time when the work of their hands was covered with stalagmite; and contemporaneous with the stalagmite must have been the cave-bear, whose bones were imbedded in it. The ossiferous caves of South Wales (Gower), Sicily, etc., yield similar results. (See KENT'S CAVERN.)

There is reason to believe that in the island of Sardinia the land has risen 100 ft. since man inhabited its shores, possessing at that time the art of fishing by nets and of making a coarse pottery. The western extremity of the island of Crete has been raised about 25 ft. since the construction of its ancient ports, which are now high and dry above the sea. Supposing the movement to have been uniform and equal in the two islands, the mussel-beds of Cagliari (in Sardinia) must have emerged from the sea more than 20,000 years ago; but before that time, man fished the waters over them, if count de la Marmora is right in conjecturing that a flat ball of baked earthen-ware, with a hole through its axis (which was found imbedded among them), was used for weighting a fishing-net.

Our last illustration shall be taken from the New World. Agassiz estimates that the southern half of the peninsula of Florida, which is built up of coral reefs, took 135,000 years to form; and hence he would estimate the age of the human jaws and teeth and bones of the feet found in one of the coral banks to be 10,000 years old.

For further information on this interesting and difficult subject, we must refer the

reader to sir Charles Lyell's work *On the Antiquity of Man*. It is right to add that many still dispute the conclusions drawn from these facts; see *The Human Species*, by Quatrefages (1879).

MAN (*ante*). See BIOLOGY; SPECIES.

MANAAR', GULF OF, lies between the w. side of the island of Ceylon and Hindustan, and is divided from Palk's passage on the n. by the islands of Ramisseram and Manaar, and by a low reef called Adam's bridge. At its n.e. extremity it is 80 m. in width; while at its south-western limit it reaches a width of nearly 200 miles.

MANACA, *Franciscea uniflora* or *Hopeana*, a plant of the natural order *scrophulariaceæ*, a native of Brazil. The whole plant, and especially the root, is found to be of great value in exciting the lymphatic system. It is nauseously bitter, purgative, emetic, emmenagogue, and alexipharmic; in overdoses, an acrid poison. It is much used in Brazil as a remedy for syphilis.

MANACOR', a t. in the island of Majorca (q.v.), in a fertile plain, 30 m. e. of Palma. It manufactures brandy, wine, and oil. Pop. 10,000.

MANA'GUA, a t. of Central America, the capital of Nicaragua, in a healthy and fertile district on the south shore of lake Managua or Leon. It owes its position chiefly to the rivalries of the cities of Granada and Leon, but partly also to its central situation.

MAN'AKIN, one of the names of a bird belonging to the order *insessores*, called also chatterer (q.v.).

MANASSAS, BATTLES OF. See BULL RUN.

MANAS'SEH, (from Heb. *Nasha*, to forget, signifies, "one who causes to forget"), the name of the eldest son of Joseph. At the Exodus, the tribe of Manasseh is said to have counted 32,200 warriors, and on entering Canaan, 52,700. It received land on both sides of the Jordan. The eastern half embraced the rich pasture-lands of Argob and Bashan, as far as the slopes of Hermon; the western extended from the Jordan to the Mediterranean, and lay between Ephraim and Issachar. MANASSEH was also the name of one of the kings of Judah (the fourteenth), who succeeded his father Hezekiah, 699 B.C., at the age of 12, and reigned, according to the narrative, for 55 years. He rushed headlong into all manner of idolatry, and seduced the people to follow his example. The sacred writers cannot otherwise express their sense of the enormity of his guilt than by saying that the very heathen never went so far in their practice of abominations as Judah did in those days. His subsequent history is differently related in *Chronicles* and in the *Book of Kings*. The apocryphal composition called the *Prayer of Manasses* is received as canonical by the Greek church.

MANASSEH BEN-JOSEPH BEN-ISRAEL, 1604–57, b. Lisbon; educated at Amsterdam, where his father had removed to escape persecution. At the age of 18 he took the place of his former instructor, rabbi Isaac Uzziel, in the Amsterdam synagogue. In 1632 he set up a Hebrew printing-press at Amsterdam, and in 1632 published the first volume of his *Conciliador*, the Latin edition of which bears the title of *Conciliator, sive de Convenientia locorum S. Scripturæ*, etc. It is a learned harmony of the Pentateuch. Its author was at once recognized as the first Hebrew scholar in England, and among his correspondents were Vossius, H. Grotius, and Huet. In 1639, deprived of his property by the Spanish inquisition, he removed to Basle, and began business as a merchant. He came to England in the time of the protectorate with the view of securing from Cromwell the concession of additional rights to the Jews. He met with a favorable reception, and succeeded in accomplishing some of the objects of his mission, after which he returned to Amsterdam. He was a friend of Grotius, and other famous scholars, and his own literary activity was great. Besides the *Conciliador*, he published editions of the Talmud, and the Hebrew Bible; *A Defense of the Jews in England*, which appeared at London, during his English visit, a work on the resurrection of the dead; and various other treatises. There is an English translation of the *Conciliador*, by E. H. Lindo; and an English life of Manasseh, by Dr. Thomas Pococke.

MANATEE', or LAMANTIN, *Manatus*, a genus of herbivorous cetacea or *manatidæ* (q.v.), readily distinguished by the rounded tail-fin, and further characterized by the presence of small flat nails at the edge of the swimming paws, and by the structure of the grinders, which have square crowns with two transverse ridges. The species, which are all inhabitants of tropical coasts, feed not only on algæ, but on the plants which grow along the shore, and are rendered accessible to them by the tide, which, after it has retired, often exhibit plain proofs of their browsing. They live chiefly in shallow bays and creeks, and in the estuaries of rivers, and often ascend rivers to a great distance from the sea. The best known species (*M. Americanus*) is found in the West Indies and on the western coasts of tropical America. It sometimes attains a length of 20 ft., and a weight of 3 or 4 tons. The skin is very thick and strong, and is almost destitute of hair. The fingers can be readily felt in the swimming paws, and, connected together as they are, possess considerable power of motion, whence the name manatee (from Lat. *manus*, a hand). The manatee is usually found in herds, which combine for mutual protection when attacked, placing the young in the center. When one is struck with a harpoon, the others try to tear out the weapon. The females show great affection for

their young. No animal is more gentle and inoffensive than the manatee. It has been tamed and rendered familiar enough to come for food when called. Vast numbers were formerly found in places where it is now comparatively rare, as its capture is easy, and its flesh—which has been variously likened to beef and pork—is held in considerable esteem. A common name for the manatee is sea-cow.—Another species is found on the coast of Florida, and a third on the w. coast of Africa.

MANATEE', a co. of s.w. Florida on the gulf of Mexico, having the Caloosahatchee river on the s., and lake Okeechobee on the s.e.; watered by the Manatee river and small streams; 4,070 sq.m.; pop. '80, 3,655. The surface is generally level, and the soil not very productive; it grows, however, Indian corn, sweet potatoes, rice, and a little sugar and cotton. Co. seat, Manatee.

MANATIDÆ, a family of *cetacea*, including all the herbivorous section of the order. Besides the distinguishing characteristics mentioned in the article CETACEA, they differ from the ordinary cetacea in having swimming paws rather than pectoral fins. It has been supposed that some of the stories of mermaids may have originated in the females of some of the manitidæ being seen with the head and breasts raised out of the water. There are three genera of manitidæ, described in the articles DUGONG, MANATEE, and STELLERINE.

MANAYUNK', a part of the city of Philadelphia, on the e. bank of the Schuylkill river, and on the Reading railroad; connected with the heart of the city by steam and horse cars, boats on the Schuylkill, and a well-made highway. The canal of the Schuylkill navigation company, extending 2 m. along the river, affords extensive water-power, which is employed in the manufacture of cotton and woolen goods and paper. There are 30 manufacturing establishments, with a capital of $6,000,000, employing nearly 5,000 persons, and producing goods annually valued at $10,000,000. The place has 8 churches, 2 weekly newspapers, 1 bank, 5 insurance companies, excellent schools, water and gas works, and a good market-house.

MANBY, GEORGE WILLIAM, favorably known for his exertions in saving the lives of persons in danger of shipwreck, was b. in 1765 at Hilgay, near Downham market in Suffolk. After studying for the army, he served seven years in the militia. Receiving the appointment of barrack-master at Yarmouth in 1803, he had frequent opportunities of witnessing the ravages produced by storms on the coast of Norfolk and Suffolk. A dreadful series of shipwrecks on a particular day in 1807, when H. M. gun-brig *Snipe* was wrecked within 60 yards of the shore, and 67 lives lost, and when 147 dead bodies were found on about 30 m. of coast, drew his attention forcibly to the subject, and led him to experiments which resulted in the invention of the apparatus known by his name (see LIFE MORTARS AND ROCKETS). On Feb. 12, 1808, he succeeded in saving the lives of the crew of the brig *Elizabeth*, which was stranded at 150 yards from the shore; he sent a rope over to them by means of a shot, and this rope was the means of pulling a boat from the shore to the brig. A career of usefulness was thus commenced, which he followed for the remaining 46 years of his life. In 1810 a committee of the house of commons voted £2,000 to Manby, as a token of recognition of his services. Being appointed to report on the dangers of the Norfolk and Suffolk coasts, he recommended the establishment of mortar-stations at certain intervals. This recommendation was adopted by the house of commons and the government; and by the year 1815 there were nearly 60 such stations. Capt. Manby received a further grant from parliament in 1823 of £5,000; to which were added honorary distinctions from many foreign governments. It was estimated that, by the time of his death, nearly 1000 persons had been rescued from stranded ships by means of his apparatus. He wrote two works on his favorite subject: *An Essay on the Preservation of Shipwrecked Persons, with a descriptive account of the Apparatus, etc.* (1812); and *Practical Observations on the Preservation of Mariners from Stranded Vessels, and the Prevention of Shipwreck* (1827). In what manner his system has since been superseded by one of a more effective kind, is described under LIFE MORTARS AND ROCKETS. Capt. Manby died Nov. 18, 1854.

MANCH, or MAUNCH (Fr. *manche*), a frequent charge in English heraldry, meant to represent a sleeve with long pendant ends, of the form worn by ladies in the reign of Henry I. Or, a manch gules, has been for a long time the arms of the Hastings family, one of whom was steward of the household to Henry I.

MAN'CHA, or LA MANCHA, a district of Spain, in the province of Ciudad Real, and the southernmost part of the kingdom of New Castile. See CASTILE.

MANCHE, a maritime department in the n.w. of France, formed from the most western district of the old province of Normandy, derives its name from La Manche (the English channel), which washes its coasts. Greatest length, 98 m.; average breadth, 27 m.; area, 1,426,289 acres. Pop. '76, 539,910. Of the entire area, 940,047 acres are cultivated, and about 235,000 acres are in meadow. The surface of the department is irregular; hills of no great elevation traverse it from n. to south. The Vire, the Douve, and the Selune are the chief rivers. The climate is mild and temperate, but somewhat humid. Flax, hemp, and fruit are extensively cultivated. Immense quantities of apples are grown, from which 44,000,000 gallons of cider are made annually. Horses of the true Norman breed are reared in the pastures, and excellent cattle of large size

are bred in the valleys. The department is divided into the six arrondissements of St. Lô, Coutances, Valognes, Cherbourg, Avranches, and Mortain. Capital, St. Lô.

MANCHESTER, a t. in Hartford co., Conn.; 8 m. e. of Hartford, on the Hartford, Providence and Fishkill railroad; pop. 4,223. The place is extensively engaged in manufacturing, there being over a dozen paper mills, and others of woolen, cotton, needles, and so on. The largest of all is the silk factory of Cheney Bros., which covers 7 or 8 acres and employs more than 1000 operatives. There is a newspaper, library, town-hall, and many schools, churches, and stores.

MANCHESTER, a t. in Essex co., Mass., on the n. shore of Massachusetts bay, and on the Gloucester branch of the Eastern railroad, 8 m. n.e. of Salem. Pop., 1665. It has 3 churches, a public library, and manufactures of leather and furniture. The purity of the air and the fine ocean views make it an attractive summer resort for many residents of Boston, New York, and other cities.

MANCHESTER, a city of New Hampshire, on the e. bank of the Merrimac river, at the falls of Amoskeag, 18 m. s. of Concord, 59 m. n.w. of Boston. The town is laid out in broad streets, shaded with elms, with 5 public squares. The falls of 54 ft. in a mile afford water-power to 5 manufacturing companies, with factories of cotton, paper, locomotives, hardware, etc. There are also extensive print-works and starch-mills. There are 16 churches, 45 public schools, 9 banks, and 2 daily and 3 weekly newspapers. Pop. '38, 50; '60, 20,107; '70, 23,536.

MANCHESTER (*ante*), a city in Hillsborough co., N. H., is reached by 4 railroads, the Concord, the Concord and Portsmouth, Manchester and Lawrence, and Manchester and North Weare. Its original name was Derryfield, under which it was incorporated in 1751. Its present name was taken in 1810, and the city charter dates from 1846. Cotton and woolen manufactories produce an enormous quantity of goods annually; water-power being furnished by the Merrimac river through canals leading from the Amoskeag falls to the mills, 4 of which have more than 300,000 spindles. There are also extensive locomotive, leather, boot and shoe, and tool shops. Among the principal public buildings are the court-house, state reform school, library, Roman Catholic convent, and others. There are 7 newspapers, of which 2 are dailies; 9 banks, and a very large number of schools and churches. The town was originally settled in 1722 by Scotch-Irish Presbyterians. The amount of capital invested in manufactures cannot be less than $10,000,000, and in this respect it is surpassed by only 3 or 4 cities in the United States. There is a great variety of manufactures besides those of cotton and woolen goods, such as boots and shoes, stockings, paper, cutlery, locomotives, steam-fire-engines. The 4 great corporations are the Amoskeag manufacturing co., the Manchester mills, the Stark mills, and the Langdon mills. The city has an excellent supply of water from Massabeesick lake, near by.

MANCHESTER, the capital of Bennington co., Vt., on the Harlem Extension railroad, 30 m. s. of Rutland, and 60 m. n. of Troy, N. Y.; pop. 1897. Its fine mountain scenery, the purity of its atmosphere, and its picturesque walks and drives, make it attractive as a resort during the summer. It has 2 churches, a classical school for both sexes, a newspaper, and is the seat of the Burr and Barton seminary.

MANCHESTER, a village of Chesterfield co., Va., on the s. bank of the James river, opposite Richmond, and the seat of important manufactures; pop. 2,599.

MANCHESTER (Sax. *Mamcestre*), a city, municipal and parliamentary borough of Lancashire, and the great center of the cotton manufacture of the n.w. of England, stands on the Irwell, 32 m. e.n.e. of Liverpool, and 188 m. n.n.w. of London by railway. On the w. side of the Irwell is the borough of Salford, communicating with that of Manchester by means of 10 bridges, and considered as virtually a portion of the city.

By the census of 1871 the inhabitants of the parliamentary borough of Manchester were 383,843, and the increase from 1851 was 67,255. In the adjoining borough of Salford the pop. in 1871 was 124,805, the increase from 1851 having been 39,662. The area of the borough of Manchester is 9.9 sq.m.; of Salford, 7.9 sq.miles. Both boroughs were enfranchised by the reform bill of 1832, Manchester returning 2 members, and Salford one member, to parliament. The reform bill of 1867 gave Manchester 3, and Salford 2 members. Manchester was incorporated in 1838, and Salford in 1844. Manchester was made a bishopric in 1847, and received the title of city in 1853. Water for the supply of Manchester is collected on the Lancashire side of Blackstone Edge, at Woodhead, and conducted from a series of reservoirs through iron pipes, nearly 20 m., to the borough. The water-works, in which are invested about £3,750,000, and the gas-works, involving about £450,000, belong to the corporation. The manorial and market rights were also acquired by the corporation in 1845 for the sum of £200,000. There are 4 public markets in Manchester, and 2 in Salford, besides the cattle market. Smithfield market in Manchester is more than 4 acres in extent, and is entirely covered in. The market-tolls and rents of Manchester alone amount to £35,000 per annum. The sale of gas makes a profit of some £44,000 per annum, which is devoted to improvements in the borough. In 1845–46 a public subscription founded 3 parks of about 30 acres each, and the corporation has since acquired a fourth park of about 60 acres. Manchester was also the first borough to take advantage of the free libraries' act, which allows an appro-

priation of a penny in the pound on the local assessment for parks, libraries, and museums; and here also was established the first free lending library in England. Five branch lending libraries and a museum have since been established in Manchester, and one reference library, one branch lending library, and an excellent museum in Salford; so that, including the old college library founded by sir Humphrey Cheetham, 1662, the people of Manchester and Salford have the free use of upwards of 130,000 volumes of ancient and modern literature, besides newspapers and periodicals.

The two boroughs have about 100 churches belonging to the establishment. The cathedral, commonly called the *old church*, built 1422, is a very fine Gothic structure, and has latterly undergone a very extensive process of restoration in its original style. There are 17 Roman Catholic and 180 dissenting chapels, some of which, especially St. John's Catholic cathedral, the church of the Holy Name, and Cavendish independent chapel, are very beautiful specimens of modern Gothic architecture. There are 3 Jewish synagogues, 4 German churches, and 1 Greek church. The principal public buildings for secular purposes are the town-hall, built at the cost of three-fourths of a million sterling, in Gothic; the royal infirmary, the royal exchange, the royal institution, all in the Grecian style; the free-trade hall, in composite; and the assize courts, in decorated Gothic. There is a home for 150 convalescents in the suburbs, founded by Robert Barnes, a former mayor of Manchester. Many of the warehouses of the merchants are palatial in appearance, and the business transacted is quite in accordance with the magnitude of the buildings. The floor of the royal exchange contains about 5,170 square yards, and is yet thronged on market-day. Manchester has four private and five joint-stock banks, besides branches of the bank of England and the national provincial bank. The celebrated Bridgewater canal connects Manchester with Liverpool, and access is also obtained for heavy barges by the rivers Irwell and Mersey. There is communication by railway in every direction. When the widening of Deansgate, Victoria street, and St. Mary's Gate took place, it caused the demolition of considerable property, and the site was sold by the corporation for £288,960, or £56 per square yard. In Albert square a prince Albert memorial has been erected. A bronze statue of Richard Cobden stands in St. Ann's square; and there is one of Cromwell (unveiled in 1875) at the foot of Victoria street. Manchester publishes 15 journals and newspapers, 5 of which are issued daily.

The chief trade is cotton spinning and manufacturing, including calico-printing and bleaching and dyeing; but there are also considerable manufactures of silk and mixed goods, of small-wares, of machinery and tools, of paper and chemicals; and Manchester is also a depot for all kinds of textile fabrics, and does a very large export trade. There are ordinarily employed in the cotton-mills about 60,000 persons, who earn about £30,000 per week in wages. There are at least 7,000 skilled mechanics constantly engaged in the production of steam-engines, spinning-mules, looms, and other machinery, chiefly for the production of the various textile fabrics, whose wages average about 32s. each per week, and who need some 1500 laborers to assist them.

The educational endowments of Manchester are small compared with its population. There is a hospital school for 100 boys, founded by Sir Humphrey Cheetham, and incorporated by Charles II.; there is also a grammar-school, with about 250 free, and 350 paying pupils, founded 1519, by Hugh Oldham, bishop of Exeter. According to a school-board return in 1873, the number of day-scholars in Manchester was 38,500 in actual attendance; and in evening schools and literary institutions there are from 4,000 to 5,000 pupils. In 1846 John Owens, a Manchester merchant, left £100,000 to found a college for secular instruction; and in connection with that institution, there are now more than 800 day and evening students. The college is well conducted, and is steadily rising in popularity. In 1873 a new building was erected at a cost of about £90,000, and the royal school of medicine was incorporated with it, whilst the natural history society and the geological societies handed over their collections into its keeping. A mechanics' institution was commenced in 1824, and is still carried on successfully. It has day and evening classes, a good library and reading-room, and all the necessary appliances for secondary education. Similar institutions on a smaller scale exist in Salford, and in the out-townships of Longsight, Rusholme, Harpurhey, Cheetham Hill, and Pendleton. In Manchester originated the agitation for free trade (see ANTI-CORN-LAW LEAGUE). Manchester was also the first place to secure the privilege of inland bonding for articles chargeable with customs duties, and now produces a large revenue from that source.

Camden, who died in 1623, says: "Where the Irk runs into the Irwell, on the left-hand bank, and scarce three miles from the Mersey, stands that ancient town called in *Antoninus* (according to different copies), *Mancunium* and *Manutium*. Perhaps, as an inland town, it has the best trade of any in these northern parts. The fustian manufacture, called *Manchester cottons*, still continues there; this, with a great variety of other manufactures, called *Manchester wares*, renders not only the town itself, but the parish about it rich, populous, and industrious." The parish of Manchester covers a large area, reaching to Stockport, Oldham, and Ashton-under-Lyne, and in the early part of the 16th c. was reckoned to have 20,000 communicants.

MANCHINEEL', *Hippomane mancinella*, a tropical American tree of the natural order *euphorbiaceæ*, celebrated for the poisonous properties of the acrid milky juice with which every part of it abounds. A drop of this juice, which is of a pure white color,

burns like fire if it falls upon the skin, and the sore which it produces is very difficult to heal. The Indians of tropical America use it for poisoning their arrows. The fruit is in form, color, and scent not unlike a small apple—the name is from the Spanish *manzanilla*, a small apple—and contains a nut about the size of a chestnut. The fluid which the fruit contains is milder than that of other parts of the tree, but its acridity is so great as immediately to repel any who, tempted by its appearance and citron-like fragrance, may ignorantly attempt to eat it. The leaves are alternate, ovate, serrate, and shining. It is said that, owing to the volatile nature of the poisonous juice, persons have even died from sleeping under the shade of the manchineel tree. Much seems to depend on the state of the atmosphere, and there is good evidence that rain or dew falling from the branches of the manchineel does produce injurious effects. The fruit of manchineel dried and pulverized, is diuretic; the seeds are excessively so. The wood is of fine quality, and well suited for cabinet-making. Whole forests of manchineel at one time existed in Martinique, which have been burned down. It grows chiefly in the vicinity of the sea. *Cameraria latifolia*, another West Indian tree, of the natural order *apocynaceæ*, is called BASTARD MANCHINEEL, from its resemblance to manchineel in its poisonous properties.

MANCHOORIA. See MANTCHURIA, *ante*.

MANCI'NI, a Roman family, beginning historically in the 14th c. with the name of Pietro Omni-Santi, surnamed Mancini dei Luci. Cardinal Francesco Maria Mancini, who married a sister of cardinal Mazarin in 1634, is the next distinguished member. His daughters, noted for their beauty and their intrigues, are spoken of by Michelet as "a battalion of Mazarin's nieces."—LAURE, 1635–57, was a favorite of Louis XIV. when prince.—OLYMPE, 1639–1708, of the "black soul and black face," a mischievous beauty, was his mistress, who was married to an Italian and bore 8 children, was charged with poisoning her husband, and became a wanderer out of France, and when in Spain was suspected of poisoning Louise, the wife of king Charles II. Prince Eugene of Savoy was one of her five sons.—MARIE, 1640–1715, another mistress of Louis XIV., who came near marrying her. She married prince Collonna in 1661, bore several children, quarreled with and left her husband, returned to Paris in want, was placed in a convent by Louis XIV., and subsequently led an adventurous life.—HORTENSE, 1646–99, a beauty, courted by Charles II. of England, by marshal Turenne, and Charles de Lorraine, was married to Armand de la Porte, marquis de la Meilleraye, who soon after assumed the title of duke of Mazarin on the death of the cardinal. She, too, was supposed to have been too free not only with Louis XIV., but with her former lovers; left her husband, entered the court of Charles Emanuel of Savoy; and on his death was expelled by his widow. She then visited Germany, and then Charles II. of England, who was soon again one of her suitors, fixed an annuity upon her, and allowed her a home in the palace of St. James.—MARIE ANNE, 1649–1714, went to Paris in 1655, was married to Maurice Godefroi de la Tour, duc de Bouillon, in 1662; soon left and afterwards rejoined her husband; became the patroness of La Fontaine, and made her home a literary center, where Molière, Corneille, and other celebrities met. She, too, became suspected of the use of poisons, and fled Paris in 1680, lived 8 years in England, 2 in Venice and Rome, and returned to Paris in 1690, where her society was courted to the last. She seems to have been the least disreputable, or vile, of a beautiful family which, if living in the present day, would be denizens of other places than the palaces of the rulers of great nations.

MANCI'NI, PASQUALE STANISLAUS, b. Naples about 1815. He became a professor of law quite young at the university of Naples; deputy to the Neapolitan parliament in 1848, and editor of a famous protest of the liberal party against the acts of Ferdinand II. Self-exiled to escape the hospitable dungeons of Ferdinand he fled to Turin, where he achieved a brilliant success at the bar, and was made law professor of the university of that city. He made a specialty of teaching the principle of nationalities as distinguished from dynasties. He was member of the Piedmontese chamber of deputies when Garibaldi's movements cut the knot of Neapolitan slavery; and he became minister of justice and ecclesiastical affairs in the provisional government. He promulgated an order to break up the mendicant and "contemplative" orders; but public opinion was not ripe for it, and it was not executed. He was deputy to the first Italian parliament in 1861, and became one of the leaders of the center, *consorteria;* one of the most brilliant orators of the parliament, and an active promoter of Italian unity and progress.

MANCO CAPAC' I., by Peruvian tradition, was the first of the Incas, and founded the royal race several centuries before the invasion of the Spaniards. He is represented in legends as a child of the sun, who with his wife, Mama Oello, instructed the natives of Peru in science, art, and architecture, and predicted the overthrow of the twelfth of his dynasty by a white race from distant lands.

MANCO CAPAC' II., the last Peruvian Inca who made any serious opposition to the Spanish power. He was the son of Huayna Capac by the daughter of a conquered chieftain of Quito. His half-brothers Huascar and Atahuallpa engaged in civil war upon their father's death, and the latter defeated and executed his rival. Atahuallpa, trusting the faith of the Spaniards, was himself falsely accused and executed in 1533.

After the death of Toparca, whose claims to the throne were supported by Pizarro, Manco claimed the title, and for a time allowed himself to be used as Pizarro's tool. But his character was naturally bold and independent; he soon escaped from his degradation, and in 1536 laid siege to Cuzco, a great part of which he burned. This was the last triumph of the Peruvian race. Manco took refuge in the Cordilleras, and for years carried on an irregular warfare to the great annoyance of his enemies. Pizarro's cruelty in scourging publicly to death a favorite wife of the Inca in retaliation for the slaying of a Spanish messenger, rendered all thought of reconciliation impossible. In 1544 Manco was killed by a party of Almagros soldiers who had taken refuge in his camp.

MAND. See ELEUSINE.

MANDALAY, MANDELAY, or PATTAWAPURA, the present capital of the kingdom of Burmah, lies 3 m. from the Irrawaddy river, a little n. of the former capital Amarapura (q.v.), and 350 m. n. of Rangoon. In 1856 its site was occupied by cultivated fields; but having been chosen by the king as the position for a new capital, was in the following year ready to receive the court. The city is laid out in three parallelograms, of which the inner two are walled. Within the inmost are the palace, and offices of government; in the second inclosure are the houses of the civil and military officers, and the quarter of the soldiers; while the outer city is inhabited by merchants, mechanics, etc. Pop. about 90,000.

MANDALAY (*ante*), situated on a bend of the Irrawaddy river, about 17 m. above the ancient capital of Amarapoora, became the capital of Burmah by command of the king in 1853. It is 400 m. n. of Rangoon, the great sea-port of all Burmah, and is reached by way of the river on steamboats. The climate is pestilential, and but for the swine, which act as scavengers, the filth to be found in all directions would render the city uninhabitable. Pigs crowd the highways, feeding from the refuse that is scattered everywhere, and these animals are under protection, and have even been the subject of provision on the part of benevolent individuals, who remembered them in their wills for the good of the city. The place is further infested with pariah dogs, vicious and noisy. The dwellings in Mandalay are constructed of bamboo, and of a dark red wood found throughout Burmah, the latter being usually ornamented with beautiful carvings. Such houses have three or four roofs, which give them an extremely picturesque appearance. A monastery near the city contains in its court-yard a number of statues representing the Buddhist Gautama, the founder of that religion, in various attitudes. A sluggish stream, the Schway-ta-Choung, with several carved wooden bridges, is near by, on the left bank of which stands the building of the former British residency, now abandoned. The citadel is built in a perfect square, of which each front is a mile in length. It is protected by a high crenelated wall, adorned at intervals by pretty seven-roofed kiosks; and by a broad moat filled with clear water, on whose surface float masses of blooming lotus-flowers, with here and there a carved war-boat, whose prow presents the figure of a dragon. A heavy gate and drawbridge at each side of the wall give access to the citadel, and are guarded by Burmese soldiers. Within are the hall of justice, the royal palace, and the abode of the sacred white elephant. The present king of Burmah, Theebaw, resides in the palace. He is the son of the late king Mindoon Men, and the youngest of three brothers. Great efforts were made towards the education of this prince, and he was trained in a Burmese convent. But on the death of his father, he seized the government, causing all the friends and near relatives of the other princes to be murdered, while they only escaped by seeking the protection of the British residency in disguise. They were afterwards smuggled to the British frontier, and were shipped to Calcutta, whence they have twice returned to Burmah, and raised rebellions, which, however, proved ineffectual. Since his accession to the throne, king Theebaw has become notorious for his bloodthirsty cruelties, until it has become a common incident to see Burmese publicly crucified in the streets of Mandalay under his orders. His reign has been one of the most vicious and despicable known to recent oriental history.

MANDA'MUS is a prerogative writ which issues from the court of queen's bench, and in some cases a similar writ issues also from the other superior courts of law, whereby the court commands some public body, or inferior court, or justices of the peace, to do something which it is their legal duty to do, and the neglect of which there is no other way of redressing.

MANDA'MUS (*ante*) is issued in this country by the highest court which has jurisdiction at law. The writ enjoins upon a court of inferior jurisdiction, a person or a corporation, the performance of a particular act as their duty. This is the usual remedy to enforce the performance by a corporation of acts within the legitimate sphere of its duties, though it will not be granted to enforce ordinary rights of contract, for which there is already a sufficient remedy in the law courts. It lies to compel the production by a corporation of its records and papers, when their evidence is material to a suit brought by a corporator; and to reinstall an ejected officer of a corporation in his office after his title thereto has been maintained at *quo warranto*. It is not granted as of right, but is issuable at the discretion of the court, and ought to be used, according to lord Mansfield, "upon all occasions where the law has established no specific remedy, and

where in justice and good government there ought to be one;" in other words, a court will not take jurisdiction by this writ unless there be no definite remedy at law.

MAN'DANS, the name of a tribe of Indians who have always inhabited the lands along the upper Missouri, having been forced by the exigencies of Indian warfare from a point about 1500 m. from the mouth of that river to their present habitat, near fort Berthold, Dakotah territory. They are of the Dakotah family, and have always been at enmity with the Sioux, who still pursue them with persistent ferocity. In 1870 a reservation of about 9,000,000 acres, partly in Dakotah and partly in Montana, was set apart by the government for the Rickarees, Minnetarees, and Dakotahs, and on this the remnant of the tribe continues to reside, numbering in 1875 about 500 souls. The Mandans are generally peaceful, live by agriculture and hunting, and are notable for the interesting and peculiar character of their rites and ceremonies, the burial of their dead, and their mode of initiating warriors. No missionary work of any importance has been performed among them, and but slight attempts have been made for their education.

MANDA'RA, or WANDALA, a kingdom in w. central Africa, s. of Bornou (or Bornoo), to which it is now tributary, situated in a fertile valley abounding in fig and other fruit and flowering trees, well watered by many springs, and protected from assault by a range of the mountains of the Moon. It is inhabited by a race of negroes much further advanced in civilization than any of the neighboring tribes, who engage quite extensively in iron and cloth manufacture and possess bodies of drilled and uniformed cavalry. The country was formerly included in Karowa, s.w. of Mandara, but became independent mainly through the adoption of the Mohammedan faith. In 1863 a war was waged with Bornou and the country was entirely subjugated, Mora, its former capital, being razed to the ground. Doloo, pop. 30,000, is now its chief city.

MANDARIN', a general term applied to Chinese officers of every grade by foreigners. It is derived from the Portuguese *mandar*, to command; the Chinese equivalent is *kwan*. There are nine ranks, each distinguished by a different-colored ball or button placed on the apex of the cap, by a peculiar emblazonry on the breast, and a different clasp of the girdle. The balls are ruby, coral, sapphire, a blue opaque stone, crystal, opaque white shell, worked gold, plain gold, and silver. Theoretically, these grades are indicative of relative merit, but as office and titles are sold to a great extent, the competitive examinations, which are the only legitimate road to distinction, have lost much of their value. A mandarin is not allowed to hold office in his native province, the intention being to prevent intrigue, and to draw to Pekin the ambition and talent of the country, where temporary employment is given in subordinate offices, prior to appointments to the provinces. He is not allowed to marry in the jurisdiction under his control, nor own land in it, nor have a near relative holding office under him; and he is seldom continued in office in the station or province for more than three years—a system of espionage which serves further to strengthen the imperial government. It is incumbent on every provincial officer to report on the character and qualifications of all under him, which he periodically transmits to the board of civil office; the points of character are arranged under six different heads, viz., those who are not diligent, the inefficient, the superficial, the untalented, superannuated, and diseased. According to the opinions given in this report, officers are elevated or degraded so many steps in the scale of merit, like boys in a class. They are required also to accuse themselves when remiss or guilty of crime, and to request punishment.

MANDARIN', a village of Duval co., Fla., on the e. bank of the St. John's river, 15 m. above Jacksonville. It is a place of winter resort, and celebrated for its fine orange crops.

MANDARIN' DUCK, a species of domestic duck brought from China and Japan. It has a brilliant plumage, a beautiful green crest, and a tuft of feathers on the back in the shape of a fan. These ducks have the reputation of conjugal fidelity and of never mating but once.

MAN'DATE is a contract by which one employs another to manage something gratuitously for him. The one is called a mandant, and the other a mandatory; the term being derived from the Roman law of *mandatum*. In England, in consequence of the doctrine that a simple contract cannot be enforced unless there is some consideration for it, or a *quid pro quo*, it is held that if the mandatory undertakes to do the work, but omits to do so, no action will lie against him, though it is otherwise if he once enter upon the work, in which case he is bound for the consequences of anything injurious or negligent. If the duty or work is undertaken, the mandatory is bound to use reasonable skill and diligence. In Scotland, where a consideration is not necessary to make a valid contract by word of mouth or writing, the mandatory is liable to an action if he has contracted or agreed to act. In Scotland, the word mandatory is used to denote a person who, in a litigation by a foreigner or person residing out of Scotland, undertakes to give security for costs, in the event of the mandant losing the suit, otherwise the suit is not allowed to go on in Scotland.

MANDAVI, the chief seaport of the principality of Cutch, Hindustan, on the n. shore of the gulf of Cutch, in lat. 22° 51′ n., long. 69° 26′ east. Though there is no regular landing-place, boats of any size can land at the sandy beach, and large vessels

find secure anchorage in the offing at a distance of about three miles from shore. Its wells are numerous, and full of water. Pop. officially estimated in 1872 at 35,988.

MANDEVILLE, Sir JOHN, an old English traveler, b. at St. Albans about the year 1300. Prompted by curiosity or love of adventure, he left his native country about 1327, visited the Holy Land, served under the sultan of Egypt and the great khan of Cathay (China); and after 33 years' wandering through Europe, Asia, and Africa, returned to England, where he wrote an account of his travels in Latin, French, and English. He died at Liége, Nov. 17, 1372. Mandeville's work is not of great value for historic geography, as he not merely states what came under his own observation, but what he heard; and he was credulous enough to admit what are now regarded as the most absurd and monstrous fables; but to do him justice, he (like Herodotus) customarily prefaces these by the phrases, "thei seyne, or men seyn, but I have not sene it." Besides, several of his statements, once regarded as improbable, have since been verified. The common notion of his being pre-eminently a "lying" traveler, is therefore in all likelihood not well founded. Leland the antiquary even says, that he had the reputation of being a very conscientious man. His book is written in a very interesting manner, was long exceedingly popular, and was translated into many languages. A MS. of Mandeville's travels, as old as the time of the author, exists in the Cottonian library. The first edition printed in England is that by Wynkin de Worde (Westminster, 1499); the last, with introduction, etc., by J. O. Halliwell, was published in London in 1839 (reprinted 1866).

MANDIBULA'TA, MANDI'BULATED or MASTICATING INSECTS, a great group or division of insects (q.v.), having the mouth of the structure described in the article *coleoptera*, and containing the orders *coleoptera, orthoptera, neuroptera,* and *hymenoptera.* The *haustellate* mouth—formed for suction—is regarded as a modification, in all its separate parts, of the mandibulate mouth.

MANDIN'GOES are, strictly speaking, the inhabitants of the most south-westerly territories belonging to the great w. African race of the Wangarawa (sing. Wangara), and inhabiting a district extending in lat. from 8° to 12° n., and between the west coasts and the head waters of the Senegal and Niger. The name, however, as generally used, is applied to the whole nation of the Wangarawa, comprising a pop. estimated by Dr. Barth at from 6,000,000 to 8,000,000. The original seat of the Mandingoes is said to be Manding, a small mountain country on the eastern sources of the Senegal, whence, partly by conquest and partly by emigration, they have spread themselves over a most extensive tract of country, and now consist of a variety of tribes. The Mandingoes are black in color, tall and well shaped, with regular features, and are, generally speaking, a fine race, capable of a high degree of civilization and organization, great travelers, fond of trading, and remarkable for their industry and energy. Of the neighboring nations, they were the first who embraced Islamism. The greater portion of them are now Moslems, and are zealous propagators of their religion.

MANDOLINE, a musical instrument of the lute species. The body of the mandoline is shaped like a shell, formed of a number of narrow pieces of different kinds of wood, bent into the shape, and glued together. On the open portion of the body is fixed the sounding-board, with a finger-board and neck like a guitar. The Neapolitan mandoline, which is the most perfect, has four double strings, which are turned, beginning with the lowest, G, D, A, E. The Milanese mandoline has five double strings, tuned G, C, A, D, E. The sound of the mandoline is produced by a plectrum in the right hand, while the left hand produces the notes on the finger-board. The mandoline is chiefly used for accompaniment; in the beauty and quality of its sound it is different from all other stringed instruments.

MANDRAKE, *Mandragora,* a genus of plants of the natural order *solanaceæ,* nearly allied to belladonna (q.v.). Two species are described by some botanists, the AUTUMNAL MANDRAKE (*M. autumnalis*), which flowers in autumn, and has lanceolate leaves and ovate berries; and the VERNAL MANDRAKE (*M. vernalis*), which flowers in spring, and has oblong ovate leaves and globose berries. Both are natives of the south of Europe and of the east, and are united by many into one species (*M. officinarum*). The root is large and carrot-like, and from it the leaves spring with no apparent stem, and among them the stalked whitish flowers. The calyx and corolla are 5-cleft, there are 5 stamens, and the fruit is a one-celled berry, about the size of a sparrow's egg. The whole plant has a very fetid narcotic smell; but the fresh berries, when cut or bruised, have a pleasant odor like that of wine or apples, and two or three may be eaten without inconvenience. All parts of the plant, however, have poisonous properties like those of belladonna, but more narcotic, for which reason a dose of the root was formerly sometimes given to patients about to endure surgical operations. The ancients were well acquainted with the narcotic and stupefying properties of mandrake, and it was a common saying, of a sleepy or indolent man, that he *had eaten mandrake.* The root often divides into two, and presents a rude resemblance to the human figure; and human figures were formerly often cut out of it, to which many magical virtues were ascribed. Sometimes the roots of the bryony were employed instead of those of the mandrake, and sold under the name of *mandrake root.* From the most ancient times, aphrodisiac virtues have been ascribed to the mandrake, which was therefore supposed to cure barrenness. See Gen. xxx. 14–16. The same reputation has been attached in America to the berries of the

nearly allied genera, *himeranthus* and *jaborosa*. Many fables connected with the mandrake are recorded by ancient and mediæval writers.

MANDRIL. See BABOON.

MANDU', an extensive deserted city of India, in the state of Dhar, in Malwa, in lat. 22° 20′ n., long. 75° 27′ east. The circumference of the ramparts is said to be 37 miles. The greatest and least injured of the ruined buildings is the jama masjit, or great mosque, the area of which is raised several yards above the ground, and is reached by a handsome flight of stairs. The mausoleum of Hoshung Ghori, king of Malwa, is a massive building of white marble. According to Malcolm, Mandu was founded 313 A.D.

MANDU'RIA (formerly *Castel-Nuova*), a t. in the Italian provence of Lecce, 20 m. e. of Taranto. Pop. '72, 7,948. It has two celebrated wells, one of which has been minutely described by Pliny, and is remarkable for the unalterable level of its waters. Near to it stood the ancient town of Manduria, of which some important relics are still extant.

MANEE'SA. See MANISSA, *ante*.

MANÉS. See LARES.

MA'NES. See MANI; MANICHÆANS; *ante*.

MAN'ETHO, a celebrated Egyptian historian, native of Sebennytus, and of the sacerdotal order, flourished in the reign of Ptolemy. According to some, he was priest of Diospolis or Heliopolis; others contend that he was high-priest of Alexandria. His name has been interpreted "beloved of Thoth;" in the *song* of Lagos and Ptolemy Philadelphus, *Mai en tet*, or *Ma net*, "beloved of Neith;" but both interpretations are doubtful. Scarcely anything is known of the history of Manetho himself, and he is more renowned for his Egyptian history than on any other account. On the occasion of Ptolemy I. dreaming of the god Serapis at Sinope, Manetho was consulted by the monarch, and in conjunction with Timotheus of Athens, the interpreter of the Eleusinian mysteries, declared the statue of Serapis, brought by orders of the king from Sinope, to be that of the god Serapis or Pluto, and the god had a temple and his worship inaugurated at Alexandria. The fame of Manetho was much increased by his writing in the Greek language, and so being enabled to communicate from Egyptian sources a more correct knowledge of the history of his native country than his Greek predecessors. Of this history, only extracts given by Josephus in his work against Apion, and an epitome by Eusebius and other ecclesiastical writers, remain. It appears to have been drawn up in a compendious annalistic style of narrative, resembling the accounts given by Herodotus. The work of Manetho was divided into three books, the first beginning with the mythic reigns of gods and kings, and ending with the 11th dynasty of mortals; the second book continued the history from the 12th to the 19th dynasty; and the third from the 20th to the 30th dynasty, when Egypt fell under the dominion of Alexander the great. The reigns of the gods are given as amounting to 24,900 years, and the epoch of Menes, the founder of the monarchy, commenced 3,555 years before Alexander (332 B.C.). The difficulties attending the reconcilation of this chronology with the synchronistic history of the Hebrews, Greeks, and other nations, have given rise to numerous speculations and chronological systems since the revival of learning, by Scaliger, Freret, Marsham, Usher, Bunsen, Böckh, Lepsius, Poole, and others. The confusion in which the lists of kings have been transmitted, the ciphers of the lengths of each reign not agreeing with the summations of the durations of the dynasties, and these, again, differing from the total period assigned to the existence of the Egyptian monarchy, has given rise to two or three schools of chronology. The so-called long chronology, which supposes, with Scaliger and Böckh, that the 30 dynasties followed consecutively one after the other, has elevated the epoch of Menes to 5,702 B.C. The short chronology, or that which endeavors to square the dates of Manetho with the Hebrew chronology, or 4004 B.C. for the year of the world, on the contrary, assumes that several of the dynasties were contemporary, and that some intervals, such as that of the rule of the shepherd-kings, have been either exaggerated or misunderstood. The accession of newer and better information from the original sources of Egyptian monuments, papyri, and other documents, has considerably enhanced the general value of the history of Manetho, which, prior to their discovery, had fallen into discredit. But the restoration of the history of Manetho, notwithstanding all these resources, and the positive epoch of the monarchy, are still to be sought, although certain dynasties, in the 2d and 3d books of his work, can be reconciled with monumental evidence. Besides the true work of Manetho above cited, which he appears to have written in the reign of Ptolemy I., or II., another work, called *Sothis*, or the *Dogstar*, in allusion to the cycle of the heliacal rising of that star of 1461 years, and dedicated to Sebastos or Augustus, the title of the Roman emperors, and not found in use before that period, has been handed down. This work seems to have been added by the epitomizers; and another work called the *Old Chronicle*, in which the history was arranged according to cycles, was compiled by them. Besides the history, Manetho wrote *Tôn Physikôn Epitome* (Epitome of Physics), treating on the origin of gods and the world, and the laws of morality; and another work on the preparation of the

sacred *kyphi*, a kind of frankincense or aromatic food. The astronomical work called *Apotelesmata* is a spurious production of the 5th c. A.D.

Suidas, *voce* Manetho; Josephus *Contr. Apion*, i. 3, 9; Bunsen, *Ægyptens Stelle*, Bd. ii.; Fruin, *Manethon. Reliq.* (8vo. Leyd. 1847); Böckh, *Manetho* (8vo. Berlin, 1845).

MANEUVER, a French word, signifying "handy-work," is somewhat vaguely used in English military and naval language to denote collateral movements, not openly apparent, of bodies of men or squadrons of ships, by which an enemy is coerced, or by which it is sought to compel him to take some course adverse to his interests.

MANFRED, king of Naples and Sicily, a rare example of heroic fortitude and disinterestedness, was a natural son of the emperor Frederick II. by Blanca, the daughter of count Bonifacius Lanzia, and was b. about 1231. On his father's death, in 1250, he received the principality of Tarentum, and in the absence of his half-brother, Konrad IV., acted as regent in Italy. Notwithstanding Konrad's dislike to him, Manfred, with unexampled fidelity, bravely defended his sovereign's interests against the machinations of pope Innocent IV.; and after Konrad's death, which the pope accused him of having caused, he was acknowledged as regent of Apulia, in name of his nephew Konradin (q.v.). The pope, however, renewed his pretensions to Apulia, and compelled Manfred to flee for shelter to the Saracens, by whose aid he defeated the papal troops at Foggia, on Dec. 2, 1254, and again obtained possession of Apulia, to which he soon afterwards added Calabria. The new pope, Alexander IV., caused a crusade to be preached against him, but Manfred, steadily pursuing his victorious career, became, in 1257, master of the whole kingdom of Naples and Sicily. On the rumor of Konradin's death he was crowned king at Palermo, Aug. 11, 1258, and immediately afterwards was excommunicated by the pope, along with his adherents, among whom were the first prelates of the kingdom; but Manfred invaded the papal dominions, levied heavy contributions from them, and made himself master of the whole of Tuscany. His power now seemed secure, and his government was at once mild and vigorous; he founded many schools, built towns and harbors, and labored in many ways for the improvement of his kingdom. But this tranquillity was not of long duration. Pope Urban IV. renewed the excommunication against him and his friends, and bestowed his dominions as a papal fief on Charles of Anjou, the brother of Louis IX. of France. Manfred, though at first successful in the war which ensued, was at last treacherously defeated, and slain in a bloody battle at Benevento, Feb. 26, 1266. His widow and children were savagely treated by the French, the daughter being confined for 18 and the sons for 31 years. His body was found some days after and interred as that of an excommunicated person; but the people, and even the French soldiers, heaped up stones for a monument, which received the name of the Rock of Roses.

MANFREDO'NIA, a city of Italy, in the province of Foggia, 26 m. n.e. of the city of Foggia, founded by Manfred (q.v.), king of Naples and Sicily, from the ruins of ancient Sipontum; pop. '72, 7,574. It is strongly walled, and an imposing castle protects its port. In the vicinity of Manfredonia are remarkable salt lakes—the *Pontano Salso* and the *Lago di Salpi*—the beds of which, during the summer heats, are thickly incrusted with salt.

MANFREDONIA, GULF OF (*Sinus Urias*), an inlet of the Adriatic, which washes the Neapolitan provinces of Bari and Capitanata, 15 m. in length and 30 in breadth.

MANGALORE', a sea-port in the district of Canara, in the presidency of Madras, lat. 12° 52′ n. In former times the harbor was good and the town prosperous, but within the present century it has become, to a great extent, silted up. Pop. (including seven villages in the vicinity) '71, 29,712. The cantonment on the north side of the town is healthy, being elevated, well drained, and open to the breezes from the sea.

MAN'GANESE (symb. Mn, equiv. 27.6; new system, 55—spec. grav. 8) is one of the heavy metals of which iron may be taken as the representative. It is of a grayish-white color, presents a metallic brilliancy, is capable of a high degree of polish, is so hard as to scratch glass and steel, is non-magnetic, and is only fused at a white heat. As it oxidizes rapidly on exposure to the atmosphere, it should be preserved under naphtha.

It occurs in small quantity, in association with iron, in meteoric stones; with this exception it is not found native. The metal may be obtained by the reduction of its sesquioxide by carbon at an extreme heat.

Manganese forms no less than six different oxides—viz., protoxide (MnO), sesquioxide (Mn_2O_3), the red oxide (Mn_3O_4), the binoxide or peroxide (MnO_2), manganic acid (MnO_3), and permanganic acid (Mn_2O_7). The *protoxide* occurs as an olive-green powder, and is obtained by igniting carbonate of manganese in a current of hydrogen. Its salts are colorless, or of a pale rose color, and have a strong tendency to form double salts with the salts of ammonia. The carbonate forms the mineral known as manganese spar. The sulphate is obtained by heating the peroxide with sulphuric acid till there is faint ignition, dissolving the residue in water, and crystallizing. It is employed largely in calico-printing. The silicate occurs in various minerals.

The *sesquioxide* is found crystallized in an anhydrous form in *braunite*, and hydrated in *manganite*. It is obtained artificially as a black powder by exposing the peroxide to

a prolonged heat. When ignited it loses oxygen, and is converted into red oxide. Its salts are isomorphous with those of alumina and sesquioxide of iron. See ISOMORPHISM. It imparts a violet color to glass, and gives the amethyst its characteristic tint. Its sulphate is a powerful oxidizing agent.

The *red oxide* corresponds to the black oxide of iron. It occurs native in *hausmannite*, and may be obtained artificially by igniting the sesquioxide or peroxide in the open air. It is a compound of the two preceding oxides.

The *binoxide*, or *peroxide*, is the black manganese of commerce and the *pyrolusite* of mineralogists, and is by far the most abundant of the manganese ores. It occurs in a hydrated form in *varvicite* and *wad*. Its commercial value depends upon the proportion of chlorine which a given weight of it will liberate when it is heated with hydrochloric acid, the quantity of chlorine being proportional to the excess of oxygen which this oxide contains over that contained in the same weight of protoxide. The reaction is explained by the equation—

Binox. Mang.		Hyd. Acid.		Chlor. of Mang.		Water.		Chlorine.
MgO_2	+	2HCl	=	MgCl	+	2HO	+	Cl

When mixed with chloride of sodium and sulphuric acid it causes an evolution of chlorine, the other resulting products being sulphate of soda and sulphate of protoxide of manganese, as shown in the equation—

$$NaCl+MnO_2+2SO_3=NaO,SO_3+MnO,SO_3+Cl.$$

When mixed with acids it is a valuable oxidizing agent. It is much used for the preparation of oxygen (q.v.), either by simply heating it, when it yields 12 per cent of gas, or by heating it with sulphuric acid, when it yields 18 per cent. Besides its many uses in the laboratory, it is employed in the manufacturing of glass, porcelain, etc.

Manganic acid is not known in a free state. Manganate of potash is formed by fusing together hydrated potash and binoxide of manganese. The black mass which results from this operation is soluble in water, to which it communicates a green color, due to the presence of the manganate. From this water the salt is obtained *in vacuo* in beautiful green crystals. On allowing the solution to stand exposed to the air it rapidly becomes blue, violet, purple, and finally red, by the gradual conversion of the manganate into the permanganate of potash; and on account of these changes of color the black mass has received the name of *mineral chameleon*.

Permanganic acid is only known in solution or in a state of combination. Its solution is of a splendid red color, but appears of a dark violet tint when seen by transmitted light. It is obtained by treating a solution of permanganate of baryta with sulphuric acid, when sulphate of baryta falls and the permanganic acid remains dissolved in the water. Permanganate of potash, which crystallizes in reddish purple prisms, is the most important of its salts. It is largely employed in analytical chemistry, and is the basis of Condy's disinfectant fluid.

Manganese is a constituent of many mineral waters, and is found in small quantity in the ash of most vegetable and animal substances. It is almost always associated with iron.

Various preparations of manganese have been employed in medicine. The sulphate of the protoxide, in doses of one or two drams, produces purgative effects, and is supposed to increase the excretion of bile; and, in small doses, both this salt and the carbonate have been given with the intention of improving the condition of the blood in cases of anæmia. Manganic acid and permanganate of potash are of great use when applied in lotions (as in Condy's fluid diluted) to foul and fetid ulcers. In connection with the medicinal applications of manganese, it may be mentioned that manganic acid is the agent employed in Dr. Angus Smith's celebrated test for the impurity of the air.

MANGE, in horses, dogs, and cattle, and scab in sheep, are diseases very similar to itch in the human subject, resulting from the attacks of minute mites, or *acari*, which burrow in the skin, especially if it be dirty or scurfy, cause much irritation, heat, and itching, and the eruption of minute pimples, with dryness, scurfiness, baldness, and bleaching of the skin. The treatment consists in destroying the *acari* and insuring the cleanliness and health of the skin, both of which objects are effected by washing the parts thoroughly every second day with soft soap and water, and dressing daily with sulphur or mild mercurial ointments, or with a solution containing four grains either of corrosive sublimate or arsenic to the ounce of water. Castor-oil seeds, bruised and steeped for twelve hours in buttermilk, are very successfully used by the native Indian farriers. Where the heat and itching are great, as is often the case in dogs, a few drops of tincture of belladonna may be used to the usual dressing, or applied along with a little glycerine. Where the general health is indifferent, as in chronic cases, the patient should be liberally fed, kept clean and comfortable, have an occasional alterative dose of any simple saline medicine, such as niter or common salt, and a course of such tonics as iron or arsenic. Cleanliness and occasional washing and brushing maintain the skin in a healthy state, and thus prevent its becoming a suitable nidus for the *acari*.

MANGEL WURZEL. See BEET; MANGOLD WURZEL, *ante*.

MANGLE, a machine for smoothing linen and cotton goods, such as table-cloths, sheets, etc., after washing. It has been much improved since the first rude invention, but does not supersede the sad-iron for the finer kinds of work.

MANGLES, JAMES, 1785–1861; b. England; entered the British navy in 1800, and was made a commander in 1815. The next year he went down the Nile, and made excavations at the temples in Ipsambool. He returned to England in 1820, by way of Syria. A collection of letters, written by him and his traveling companion, commander Charles Leonard Irby, was printed for private circulation in 1823, and given to the public in 1844, as *Travels in Egypt and Nubia, Syria, and the Holy Land.*

MANGO, *Mangifera*, a genus of trees of the natural order *anacardiaceæ*, having flowers with four or five petals, five stamens, of which the greater part are generally sterile, one ovary seated on a fleshy disk, the fruit a fleshy drupe. The COMMON MANGO (*M. Indica*) is a native of India. It is a spreading tree of rapid growth; 30 to 40 ft. in height, the stem only rising 8 to 10 ft. before it divides into branches; the foliage so dense as to be impenetrable to the burning rays of the sun, affording a most grateful shade; the leaves lanceolate, entire, alternate, stalked, smooth, shining, leathery, and about 7 or 8 inches long, with a sweet resinous smell. The flowers are small, reddish-white or yellowish, in large erect terminal panicles; the fruit is kidney-shaped, smooth, varying considerably in size and color, and containing a large flattened stone, which is covered on the outside with fibrous filaments, longest and most abundant in the inferior varieties, some of which consist chiefly of fiber and juice, whilst the finer ones have a comparatively solid pulp. The fruit of some of the varieties in cultivation is as large as a man's fist. The mango is much prized for the dessert; it is luscious and sweet, with slight acidity. It was introduced into Jamaica in 1782, and is now very generally cultivated in tropical and subtropical countries. The unripe fruit is made into tarts and pickles. Mango kernels are nutritious, and have been cooked for food in times of scarcity. The tree is raised from seeds; the finer varieties are propagated by layering and inarching, and trees obtained in this way often bear much fruit without attaining a large size. There are several other species of mango, natives of different parts of the east, but the fruits of all of them are very inferior.

MANGO FISH, *Polynemus paradiseus*, a fish which inhabits the bay of Bengal, and ascends the Ganges and other rivers to a considerable distance. It is accounted one of the most delicious fishes of India, but is particularly esteemed when salted and prepared in a peculiar manner, when it bears the name of *burtah*. The name mango fish is given to this fish from its beautiful yellow color, resembling that of a ripe mango. Another Indian name is *tupsee*. It is of a perch-like form, and belongs to a genus formerly referred to the perch family (*percidæ*), but now the type of a distinct family (*polynemidæ*), having the ventral fins behind the pectorals, although partially attached to the bones of the shoulder, and the lower rays of the pectorals extended into threads, which in the mango fishes are twice the length of the body. The mango fish is seldom more than 8 or 9 in. in length. The genus *polynemus* contains a number of species of tropical fishes, the air-bladders of some of which are of importance as isinglass; those of *P. Indicus*, a fish sometimes 20 lbs. weight, and other species, forming a considerable article of export from Singapore, under the name of *fish-maws*.

MAN'GOLD-WURZEL (Ger. beet-root), or MANGOLD (Ger. beet), a name in general use in Britain and America, to designate the varieties of the common beet (q.v.) cultivated in fields for the feeding of cattle. By mistake the name was at first written *mangel-wurzel*, and this erroneous form is still sometimes used. The field-beets differ from the garden-beets chiefly in being larger in all their parts, and coarser. They have large roots, which in some of the varieties are red, in some greenish or whitish, in some carrot-shaped, and in some nearly globular. The cultivation of mangold-wurzel as a field-crop was introduced into England in 1786, but it is only of late that it has much extended. At first, so little was its value known, that the leaves alone were used as food for cattle. Its importance, however, was soon appreciated, and it rapidly gained favor. It is much more patient of a high temperature than the turnip, liable to fewer diseases, and vastly more productive under liberal treatment. In the island of Jersey, and in highly manured grounds in the vicinity of London, as much as from 70 to 80 tons to the acre have been raised. Throughout the south of England it is generally admitted that it is as easy to grow 30 tons of mangold-wurzel to the acre as 20 tons of Swedish turnips. The lower temperature of Scotland, however, does not admit of the crop being raised to the same advantage. The yield is much smaller than in the south, and the plants are more liable to run to flower. This seems to be owing to the cold contracting the vessels, and in some measure acting in the same manner as a diminished supply of food in favoring the formation of seed. The increased precariousness of the turnip-crop of late years, however, has induced many to make trial of the cultivation of mangold-wurzel, and with considerable success. The mode of culture does not vary materially from that followed in Scotland in raising turnips. The land in which the crop is to be planted receives a deep furrow in autumn; and if it is quite free from perennial weeds, it is often previously well manured. Drills or ridges, from 20 to 30 in. wide, are formed in spring by the doubled-molded plow; and if manure has not been applied in autumn, from 20 to 30 loads are spread along the furrows. In addition, from 3 to 4 cwts. of guano, and 4

cwts. of ammonia salt, are sown broadcast over the drills; indeed, this crop can rarely be over-manured. The manures are then covered by the plow, and the ridges are afterwards run over with a light roller, to smooth them down. Two or three seeds are then dibbled in on the tops of the ridges, from 1 ft. to 1½ ft. apart. It requires about 7 lbs. of seed to the acre; and as the grains are inclosed in a hard and rough coat, they may be moistened in water for two days previous to their being planted, for the purpose of promoting a quick and regular braird. The long red, the round red, and the round green-topped yellow are all favorite varieties in England. As soon as the plants are about 3 in. above ground, they are singled out by the hand, and their cultivation is afterwards the same in all respects as in the case of Swedish turnips. The crop is usually ready to be taken up by the end of October; indeed, it should not be delayed beyond this period, for, being a native of the warm coasts of the Mediterranean, it is injured by severe frost. The leaves are wrenched off by the hand, and the earth is merely roughly taken away from the roots, as they do not keep well through the winter if cut or bruised. The roots are stored in pits or clamps, covered with straw and a little earth, as a protection in severe weather. It is some time after storing before the roots can be used with advantage; for in autumn and the early part of winter, its juices being unripened, have a laxative effect on animals. Swedish turnips are at this season preferred for feeding; but the harshness of the mangold-wurzel wears off by spring, and it then becomes an excellent food for stock of all kinds, and if well kept, retains its juiciness till the middle of summer.

MAN'GON, or MAN'GONEL. See BALISTA.

MAN'GOSTAN, *Garcinia mangostana*, one of the most delicious of all fruits, produced by a tree of the natural order *guttiferæ* or *clusiaceæ*, a native of the Molucca islands. The tree is in general only about 20 ft. high, but of beautiful appearance, having an erect tapering stem and a regular form, somewhat like that of a fir; the leaves 7 or 8 in. long, oval, entire, leathery, and shining; the flowers are large, with corolla of 4 deep red petals. The fruit, in size and shape, resembles an orange; it is dark brown, spotted with yellow or gray, has a thick rind, and is divided internally by thin partitions into cells. The pulp is soft and juicy, of a rose color, refrigerant and slightly laxative, with a mixture of sweetness and acidity, and having an extremely delicate flavor. It may be eaten very freely with perfect safety, and is esteemed very beneficial in fevers. The mangostan is cultivated in Java and in the s.e. of Asia; it has recently become common in Ceylon, and has been successfully introduced into some other tropical countries.

MANGOUSTE, or MONGOUS. See ICHNEUMON, *ante*.

MAN'GROVE, *Rhizophora*, a genus of plants of the natural order *rhizophoraceæ*. This order consists of trees and shrubs, all tropical and natives of coasts, particularly about the mouths of rivers, where they grow in the mud, and form a close thicket down to and within the marge of the sea, even to low-water mark. Most of the species send down roots from their branches, and thus rapidly extend over large spaces, forming secure retreats for multitudes of aquatic birds, whilst crabs are also to be found in them in vast numbers, and shell-fish are attached to the branches. The order is distinguished by simple, opposite leaves, with convolute deciduous stipules between the leaf-stalks; the ovary 2 to 4 celled, each containing two or more ovules; the fruit not opening when ripe, crowned with the calyx, 1-celled, 1-seeded. The seeds have the peculiarity of germinating whilst still attached to the parent branch, a long thick radicle proceeding from the seed, piercing its covering, and extending rapidly downwards, till the fruit falls off, when it is soon imbedded in the mud, into which its form, club-like, the heavy end downwards, secures that it shall penetrate in a right position. The whole number of species known is only about 20; the wood of some is hard and durable. The fruit of the common mangrove (*rhizophora mangle*) is sweet, eatable; and its juice, when fermented, yields a light wine. The bark of the common mangrove is sometimes imported into Britain for the use of tanners, but it is only of second-rate quality.

MANGUM, WILLIE PERSON, 1792–1861; b. Orange co., N. C.; graduated at the North Carolina university in 1815; was a successful lawyer and whig politician; elected a judge of the superior court in 1819 and 1826; was a member of congress 1823–26, and U. S. senator 1831–37 and 1841–53. He was president of the senate during the administration of John Tyler. In 1837 he received 11 electoral votes for president of the United States.

MANHATTAN ISLAND. See NEW YORK.

MANHEIM. See MANNHEIM, *ante*.

MANI, MANES, MANICHÆUS (entitled *Zendik*, Sadducee), the founder of the heretical sect of the Manichæans (q.v.), who lived in the 3d c., A.D. Little is known with regard to his early history, and the accounts transmitted through two distinct sources—the western or Greek, and the eastern—are legendary and contradictory on almost every important point. According to certain—very dubious—acts of a disputation held between Manes and Archelaus, bishop of Cascar (?), he was first called Curbicus, and was bought as a slave, at the age of seven years, by the wife of one Ctesiphon, in Babylonia, who gave him a good education, and at her death made him sole heir. Among the books

she left him, he is said to have found the writings of Scythianus, which had been given to her by one of the latter's disciples named Terebinthus, or *Budda*. Mani emigrated into Persia, where he remained up to his sixtieth year, and changed his former name, so as to obliterate all traces of his origin and former state. Here he also became acquainted with the New Testament and other Christian works; and gradually conceived the idea of amalgamating the Magian with the Christian religion, and of adding what he knew of Buddhism to the new faith. For the better carrying out of this plan, he announced that he was the paraclete promised by Christ. King Sapor I. of Persia, in whose days he first proclaimed his mission, at first looked not unfavorably upon his proceedings; but when he had failed to heal the prince, his son, he was cast into prison, whence he managed to escape, but, pursued and captured, he was publicly executed. According to other accounts, however, Mani was the scion of a noble Magian family, and a man of extraordinary mental powers, and artistic and scientific abilities—an eminent painter, mathematician, etc.—embraced Christianity in early manhood, and became presbyter at a church in Ehvaz or Ahvaj, in the Persian province of Hazitis, gave himself out to be the paraclete, and styled himself in ecclesiastical documents "Mani, called to be an apostle of Jesus Christ through the election of God the Father." Persecuted by king Sapor I., he sought refuge in foreign countries, went to India, China, and Turkistan, and there lived in a cave for 12 months, during which he is said to have been in heaven. He reappeared with a wonderful book of drawings and pictures, called Erdshenk or Ertenki-Mani. After the death of Sapor (272 A.D.), he returned to Persia, where Hormuz, the new king, who was well inclined towards him, received him with great honors, and in order to protect him more effectually against the persecutions of the Magi, gave him the stronghold of Deshereh, in Susiana, as a residence. After the death of this king, however, Behram, his successor, entrapped Mani into a public disputation with the Magi, for which purpose he had to leave his castle; and he was seized upon, flayed alive, and hung before Djondishapur, 277 A.D. For his doctrine, etc., see MANICHÆANS.

MANIA is the form of mental derangement most familiar to ordinary observers. The excitement and violence by which it is sometimes characterized have become, erroneously and unfortunately, the type and standard by which the disease and those subject to it have been recognized and treated. These qualities occasionally involved danger to those around, and were always calculated to inspire fear; so that for centuries they were counteracted by repression, coercion, and harshness. It is worthy of remark that contemporaneously with the establishment of confidence, and with the introduction of a humane system of treatment, the fury and formidable pugnacity of the insane to a great degree disappeared. This effect, must, however, in part be referred to that change of type in the nature of the malady itself which is supposed to depend upon a modification in the human constitution, as well as upon external circumstances, and which has been observable in all affections of an inflammatory character since the beginning of the present century. The discontinuance of restraint, and the cessation of the necessity for such a measure in asylums, whether regarded as protective or remedial, may be accepted as a proof of the reality and extent of this change, upon whatever it may depend. It is, moreover, probable that, by the accuracy of modern diagnosis, cases of wild frenzy, depending upon fever or inflammation of the brain, have been distinguished from those of true mania, and its true features thus better determined. These are loss of appetite, general uneasiness and irritation, watchfulness, headache, restlessness, intense stimulation of the passions and propensities, rapid ideation, incoherence and loquacity, violence or unbridled agitation and extravagance; and, as the disease advances, emaciation, hollowness of the cheeks and eyes, discoloration of the skin, brilliancy and fixity of eyes. However similar these symptoms may be to what are seen in the fevered and the phrenetic, great caution must be exercised in concluding that the circulation is involved directly, or at all, for of 232 cases examined by Jacobi, 23 only presented any indications of fever, and in these this condition was attributable to hectic and other causes unconnected with mania. Esquirol rarely mentions the pulse as affording any guidance in this kind of alienation. The true interpretation of these symptoms appears to be that they are connected with debility and exhaustion; that although, remotely, they may originate in any organ or condition, they proximately depend upon impaired nutrition and irritation of the nervous system, calling for support, stimulation, calm, and repose, alike moral and physical. The classification of the various aspects under which mania occurs has been so far regulated by the bodily affection with which it is complicated or associated. Epileptic mania, the most furious and formidable, and puerperal mania, perhaps the most intractable species, consist in the superaddition of the indications formerly detailed to certain states of the nervous system, and to that of parturition. Whatever the combination or complication, however, the essential psychical characteristic of mania is that all mental powers are involved, and are thrown into a state of exaltation and perversion. When the initiatory extravagance and excitement have subsided, when the affection has become chronic, delusions, previously existing, become prominent, and impart a predominating complexion to the condition. It is probable that, wherever delusions or hallucinations are detected, although they may seem solitary deviations from health, there is a broader and deeper substratum of disease, of which they are trivial manifestations; and where mania has ushered in such affections, the original disease may be held to remain while they remain, and to be reacted upon, and,

under certain circumstances, roused into activity through their instrumentality. In these views may be found an explanation of those partial mental derangements which appear to co-exist with health.—Bucknill and Tuke, *Psychological Medicine—Sketches in Bedlam.*

MANIA. See INSANITY.

MANICA, a small state of s.e. Africa, in the territory of Monomotapa, but tributary to the Portuguese. It is a mountainous region, and produces gold and copper, which, with ivory, form the chief articles of export, and are exchanged with the Portuguese for silk, linen, and iron. Many parts are fertile, affording pasturage for large herds of cattle.

MANICHÆANS, a religious sect, founded by Mani (q.v.), which, although it utterly disclaimed being denominated Christian, yet was reckoned among the heretical bodies of the church. It was intended to blend the chief dogmas of Parsism, or rather Magism, as reformed by Zoroaster, with a certain number of Buddhistic views, under the outward garb of biblical, more especially New Testament history, which, explained allegorically and symbolically, was made to represent an entire new religious system, and one entirely at variance with Christianity and its fundamental teachings. The Manichæans assumed, above all, two chief principles, whence had sprung all visible and invisible creation, and which—totally antagonistic in their natures—were respectively styled the Light, the Good, or God, and the Darkness, the Bad, Matter, or Archon. They each inhabited a region akin to their natures, and excluding each other to such a degree that the region of darkness and its leader never knew of the existence of that of the light. Twelve æons—corresponding to the twelve signs of the zodiac and the twelve stages of the world—had sprung (emanated) from the primeval light; while "darkness," filled with the eternal fire, which burned but shone not, was peopled by "demons," who were constantly fighting among themselves. In one of these contests, pressing towards the outer edge, as it were, of their region, they became aware of the neighboring region, and forthwith united, attacked it, and succeeded in carrying the ray of light that was sent against them at the head of the hosts of light, and which was the embodiment of the ideal or primeval man (Christ), captive. A stronger æon, however (the Holy Ghost), hurried to the rescue, and redeemed the greater and better part of the captive light (Jesus impatibilis). The smaller and fainter portion, however (Jesus passibilis), remained in the hands of the powers of darkness, and out of this they formed, after the ideal of *The Man of Light*, mortal man. But even the small fraction of light left in him (broken in two souls) would have prevailed against them, had they not found means to further divide and subdivide it by the propagation of this man (Eve—sin). Not yet satisfied, they still more dimmed it by burying it under dark "forms of belief and faith, such as paganism and Judaism." Once more, however, the original light came to save the light buried in man, in the person of Christ, descending from the sun, with which he is one. The demons succeeded, however, in cutting his career of salvation short by seducing man to crucify him. His sufferings and death were naturally only fictitious, since he could not in reality die; he only allowed himself to become an example of endurance and passive pain for his own, the souls of light. Since, however, even his immediate adherents, the apostles, were not strong enough to suffer as he had bid them, he promised them a paraclete, who should complete his own work. This paraclete was Mani, who surrounded himself, like Christ, with twelve apostles, and sent them into the world to teach and to preach his doctrine of salvation. The end of the "world" will be fire, in which the region of darkness will be consumed and utterly annihilated. To attain to the region of eternal light, it is necessary that passion, or rather the body, should be utterly subdued; hence rigorous abstinence from all sensual pleasures, asceticism, in fact, to the utmost degree, is to be exercised. The believers are divided into two classes, the elect and the auditors. The elect have to adhere to the *Signaculum, Oris, Manus,* and *Sinus*, that is, they have to take the oath of abstinence from evil and profane speech (including "religious terms such as Christians use respecting the Godhead and religion"), further, from flesh, eggs, milk, fish, wine, and all intoxicating drinks (cf. Manu, *Instit.* vv. 51, 52, 53: "He who makes the flesh of an animal his food . . . not a mortal exists more sinful . . . he who . . . desires to enlarge his own flesh with the flesh of another creature," etc.); further, from the possession of riches, or, indeed, any property whatsoever; from hurting any being—animal or vegetable; from heeding their own family, or showing any pity to him who is not of the Manichæan creed; and finally, from breaking their chastity by marriage or otherwise. The auditors were comparatively free to partake of the good things of this world, but they had to provide for the subsistence of the elect, and their highest aim also was the attainment of the state of their superior brethren. In this Manichæan worship, the visible representatives of the light (sun and moon) were revered, but only as representatives of the ideal, of the good or supreme God. Neither altar nor sacrifice was to be found in their places of religious assemblies, nor did they erect sumptuous temples. Fasts, prayers, occasional readings in the supposed writings of Mani, chiefly a certain *Fundamental Epistle*, were all their outer worship. The Old Testament they rejected unconditionally: of the New Testament they retained certain portions, revised and redacted by the paraclete. (August. c. Faust., book xviii.; cf. book ix.). Sunday, as the day on which the visible universe was to be consumed, the day consecrated to the sun, was kept as a great festival; and the most solemn day in their year was the anniversary of the death of Mani.

Baptism and the Lord's supper were celebrated as mysteries of the elect. Of this mode of celebration, however, we know next to nothing; even Augustine, who for about nine years belonged to the sect, and who is our chief authority on this subject, confesses his ignorance of it. As to the general morality of the Manichæans, we are equally left to conjecture; but their doctrine certainly appears to have had a tendency, chiefly in the case of the uneducated, to lead to a sensual fanaticism hurtful to a pure mode of life.

The outward history of the sect is one of almost continuous persecution. Diocletian, as early as 296 A.D., issued rigorous laws against them, which were reiterated by Valentinian, Theodosius I., and successive monarchs. Notwithstanding this, they gained numerous adherents; and very many mediæval sects, as the Priscillians, Katharenes, Josephinians, etc., were suspected to be secretly Manichæans. Italy, the south of France, Spain, and even Germany, were the successive seats of this sect, which did not disappear entirely until the time of the reformation.

MANIFES'TO, a public declaration issued by a sovereign prince or by a government on some state emergency, expressive of intentions, opinions, or motives. Immediately before entering on a war, a manifesto is issued containing a statement of the reasons which have been held to justify the sovereign or government in taking up arms. In case of a revolt, a manifesto is sometimes issued to recall subjects to their allegiance.

MANIGAULT, GABRIEL, 1704–81; b. S. C., of Huguenot parentage; became a merchant, acquired great wealth, and in the beginning of the war of independence loaned to the state of South Carolina the sum of $220,000. In 1779, when Prevost attacked Charleston, Manigault, at 75 years of age, with a grandson but 15 years old at his side, was among the volunteers who defended the city.

MANIL'A HEMP. See ABACA, *ante.*

MANIL'A, the capital of the Philippine islands (q.v.), and residence of the Spanish viceroy, or governor of the Philippine archipelago, is situated in the island of Luzon, on the banks of the river Pasig, and at the embouchure of that river in the bay of Manila. It is divided by its river into Manila proper and Binondo. Manila proper, or the *city* of Manila, consisting of 17 spacious streets, crossing at right angles, contains the cathedral; the *palacio,* built in 1690; the archiepiscopal palace, the hall of audience, 11 churches and 3 convents, besides public offices, barracks and other military establishments. Beyond the ramparts, on the east side, is the calzada, or public promenade, crowded in the evening by carriages and equestrians. Instead of glazed windows, the houses are furnished with sliding frames, fitted with plates of semi-transparent oyster-shells. Binondo is larger and more animated than Manila; but the streets are less regular, and many still unpaved. Numerous canals intersect this suburb, which is the residence of the wealthy merchants. The bay and harbor of Manila are magnificent, and the Pasig is navigable for 10 miles. The trade is chiefly with the United States, Great Britain, China, and Australia. Manila is by law the only emporium of foreign trade with the Spanish East Indies. Its principal exports are sugar, abaca (Manila hemp), cigars, leaf tobacco, coffee, rice, and fine woods. The imports consist chiefly of woven goods from Manchester and Glasgow, with lead, iron-ware and beer; silks, nankins, vermilion, and curiosities are imported from China. The cheeroots of Manila are famous; they are generally preferred to those of Havana everywhere east of the cape of Good Hope. Their manufacture is under the charge of an administration whose headquarters are at Manila; 20,000 persons are employed in this branch of manufacture. The climate of Manila is on the whole healthy, and the average temperature throughout the year is nearly 82°. Convulsions of the earth have frequently made frightful ravages in this city. In 1824, many churches, private houses, etc., were destroyed, and the ships in the harbor were wrecked, but the number of victims was never ascertained. In 1828 and 1857, severe shocks were felt; but on June 3, 1863, one of the most dreadful earthquakes almost ruined the city. The cathedral and all the churches, with one exception, were overthrown; the palace of the viceroy and the British consulate were destroyed; and a number of lives, of which 2,000 seems but a moderate estimate, were lost. On Oct. 30, 1875, a violent hurricane killed 250 persons, and destroyed 3,800 houses. Manila is one of the four ports of the Philippine archipelago which are open to foreign vessels. In 1874 the value of the exports from Manila was $15,889,817 (about £3,178,000); and that of imports from Great Britain was £873,435. Pop., including suburbs (1865), 230,443.

MANILIUS, MARCUS, lived, according to Bentley, who has edited his works, at about the time of Augustus; but both his name and identity are in great doubt, as well as his birthplace, which Bentley claims to have been in Asia; others in Rome. He is known only as the author of a poem called *Astronomica,* of which five books are extant treating of the fixed stars. Probably others on the planetary system have been lost or never completed. As an astronomer Manilius seems to have been somewhat in advance of his age, but as poetry his book has small value.

MANIN, DANIEL, an illustrious Italian patriot and political leader, elected, during the revolution of 1848, president of the Venetian republic. Born in 1804 at Venice, Manin graduated at the university of Padua, was admitted doctor of laws at 19, and subsequently practiced at the bar, of which his father, Pietro Manin, was an eminent mem-

ber. From 1831 he became a recognized leader of liberal opinion in Venice; in 1847 his reputation as a political economist was established during the sittings of the scientific congress at Venice; and shortly after he was thrown into prison for a spirited public address of which he was the author.

Previous to the outbreak of 1848, Manin was for the second time incarcerated; but on the promulgation of the news that Paris, Naples, and Tuscany were in revolution, he was released in triumph by the populace, and was at once invested with supreme power. The organization of a civic guard, and the expulsion of the Austrians from the arsenal, were Manin's first public measures; the mob that clamored for the lives of their former oppressors, shrunk back abashed at his dignified rebuke.

From the period of his election to the presidency of the Venetian republic, Manin's energies were devoted to the organization of the inhabitants for self-defense.

During the annexation of Lombardy to Piedmont, Manin laid down his authority; but on the defeat of the Sardinian army at Novara, Mar. 23, 1849, he resumed it, and was the animating spirit of the entire population of Venice during the heroic defense of the city for four months against the besieging Austrian army. On Aug. 24, Venice capitulated; but Manin, with 40 of the principal citizens, being excluded from all stipulations, quitted the city. He retired to Paris, where he taught his native language, declining innumerable offers of aid. From thence he proclaimed his desire that the republican system should give place in Italy to the Sardinian monarchy, or any executive form tending to get rid of Austrian rule. He died of heart-disease in Paris in Sept., 1857.

In this really great man appeared a rare union of qualities the most exalted, enthusiasm being guided by great practical sagacity; extreme personal humility coexisting with a lofty sense of authority, and great faculty for command; and the energy and fire of action being equaled by the calm and stoical endurance of defeat and mortal disease.

MA'NIOC, MANDIOC, or CASSAVA, *Manihot utilissima,* formerly known as *jatropha manihot,* and as *janipha manihot,* a large, half-shrubby plant of the natural order *euphorbiaceæ,* a native of tropical America, and much cultivated there. It is now also extensively cultivated in Africa, and has been introduced into other tropical countries. Manioc, or *mandioca,* is the Brazilian name; *cassava,* the West Indian; and in Peru and some other parts of South America, the name is *juca* or *yucca.* The plant grows in a bushy form, with stems usually 6 to 8 ft. high, but sometimes much more. The stems are white, brittle, and have a very large pith; the branches are crooked. The leaves are near the extremities of the branches, large, deeply 7-parted. The roots are very large, turnip-like, sometimes weighing 30 lbs., from three to eight growing in a cluster, usually from a foot to two feet long. In common with other parts of the plant, they contain an milky juice, so poisonous as to cause death in a few minutes; but as this is owing to the acrid presence of hydrocyanic acid, which is quickly dissipated by heat, the juice, inspissated by boiling, forms the excellent sauce called Casareep (q.v.); and fermented with molasses, it yields an intoxicating beverage called *ouycou;* whilst the root, grated, dried on hot metal plates, and roughly powdered, becomes an article of food, very largely used in South America, and there very generally known as *farinah* (Portug. meal). It is made into thin cakes, like the oat-meal cakes of Scotland, which are formed, however, not by mixing it with water, but by the action of heat softening and agglutinating the particles of starch. These cakes are sometimes called *cassava* or *cassada bread.* It is also imported into Britain, to be used in manufactories as starch. The true starch of manioc, separated in the ordinary manner from the fiber, is also imported in considerable quantity into Britain, under the name of *Brazilian arrow root;* and from it tapioca is made, by heating it on hot plates, and stirring with an iron rod; the starch-grains burst, some of the starch is converted into dextrine, and the whole agglomerates into small irregular masses. Another species or variety of manioc is also cultivated, the roots of which contain a perfectly bland juice, and are eaten raw, roasted or boiled. This, the SWEET CASSAVA or SWEET JUCA (*M. aipi* of some botanists, said to be a native of Africa as well as of America), is described as having the leaves 5-parted, and the root of longer shape than the common or bitter cassava, and much smaller, only about six ounces in weight; but other descriptions represent the sweet cassava as having roots quite equal in size to the bitter. The manioc is easily propagated by cuttings of the stem, and is of rapid growth, attaining maturity in six months. The produce is at least six times that of wheat.

MA'NIS, a genus of mammalia, of the order *edentata,* containing several species, natives of Africa and the warm parts of Asia, and in their habits and many of their characters closely resembling the ant-eaters (q.v.) of South America; but having, among other differences, the body and the tail covered with an armor of large sharp-edged and pointed scales. The species are pretty numerous. One, remarkable for the length of its tail, the *phattagen* of the ancients (*M. tetradactyla*), inhabits western Africa. It is about 5 ft. long, of which the tail occupies 3 feet.—Another, the SHORT-TAILED MANIS (*M. pentadactyla*), is common in many parts of the East Indies.

MAN, ISLE OF, is situated in the Irish sea, in n. lat. 54° 3′ to 54° 25′, and w. long. 4° 18′ to 4° 47′; the shortest distance between the island and the adjacent countries being from point of Ayre to Burrow head in Scotland, 16 miles. The length of the island is 33¼ m., breadth 12½ m., and area about 145,325 acres, of which more than 90,000 are cul-

tivated. At the south-western extremity is an islet called the Calf of Man, containing 800 acres, a large portion of which is under cultivation. A chain of mountains extends from n.e. to s.w., the highest of which is Snaefell, 2,024 ft. above the mean sea-level: from its summit, the view is very imposing; the picturesque glens and undulating country in the foreground; the rich plains of the n. and s. of the island in mid-distance; and beyond, the Irish sea, bounded by the high lands of the surrounding countries, on which even the corn-fields may be descried. Several streams take their rise in these mountains, in some of which trout abound, though in many the fish have been destroyed by the washings from the lead mines. The coast-scenery from Maughold head on the e., passing s. to Peel on the w., is bold and picturesque, especially in the neighborhood of the Calf, where Spanish head, the southern extremity of the island, presents a sea-front of extreme grandeur.

The greater part of the island consists of clay-slate under various modifications. Through the clay-schist, granite has burst in two localities, in the vicinity of which mineral veins have been discovered, and are extensively worked. Nearly 4,000 tons of lead are extracted annually, as well as considerable quantities of copper, zinc, and iron; the lead ore is very rich in quality, as much as 108 oz. of silver having been occasionally extracted from the ton.

The island is divided into 6 *sheadings;* these into parishes, of which there are 17; these, again, into *treens;* and, lastly, into *quarterlands.* The towns are Castletown (q.v.), Douglas, the modern capital (q.v.), Peel (q.v.), and Ramsey (q.v.).

Within the past few years great improvements have been made in the island. At Douglas, a beautiful promenade has been erected; also a handsome landing-pier, at a cost of £48,000. Very extensive breakwater and other harbor works have been erected at Douglas. The total expense has been over £200,000. An outer pier and breakwater, constructed of concrete cement blocks, at a cost of about £150,000, was opened in 1879. At Ramsey, a public promenade and inclosure on the foreshore have been carried out; and harbor works have been erected both here and at Port Erin, in the latter case at a cost of £77,500. Port Erin harbor is more especially designated for the herring fleet, and for the steamers from Ireland, which are expected yet to form a great trade for the island, as a port of call between England and Ireland. A sum of close on £10,000 has been expended in casing the existing breakwater at Peel. To cover the extensive outlay on harbor works the consent of the imperial treasury was asked and obtained in 1866 for the readjustment of duties on articles imported into the island, such as spirits, wines, tobacco, teas, sugar, etc.

The Isle of Man possesses much to interest the antiquary. Castle Rushen (see CASTLETOWN), probably the most perfect building of its date extant, was founded by Guthred, son of king Orry, in 947. The ruins of Rushen abbey, dated from 1154, are picturesquely situated at Ballasalla. There are numerous so-called Druidical remains and Runic monuments throughout the island.

The population of the island, in 1871, was 53,763; in 1861, 52,469; the small rate of increase being attributable to emigration. The language of the natives is a dialect of the Celtic, and is closely allied to the Gaelic and the Erse or Irish. As a spoken language, it is almost entirely disused.

The climate is remarkable for the limited range of temperature, both annual and diurnal; westerly and south-westerly winds greatly predominate; easterly and north-easterly winds occurring chiefly in the autumn quarter. Myrtles, fuchsias, and other tender exotics flourish throughout the year.

The fisheries afford employment to nearly 4,000 men and boys. More than 700 boats of various tonnage are employed in the herring and cod fisheries, the average annual produce being above £60,000. In addition to these, a large number of English and Irish boats arrive at the island during the fishing season. Besides the herrings consumed fresh, there are about 40,000 barrels cured. The trade is chiefly coastwise; the exports are limited to the products of the island.

Agriculture has of late years made considerable progress. Large numbers of fat cattle are shipped to the English markets, as well as about 20,000 quarters of wheat annually. The manufactures are inconsiderable; but to make up for this, about 100,000 visitors come to the island each season.

The revenue derived from the island amounts to about £50,000 per annum; of which the greater part is received from customs duties, and the whole of which, except £10,000 a year payable to the imperial treasury, is used for insular purposes, such as public improvements, education, police, cost of government, etc.

The principal line of communication with the United Kingdom is between Douglas and Liverpool, by means of a fine fleet of swift steamers. There is a submarine telegraphic cable between Maughold head and St. Bees head. In July, 1873, a line of railway was opened between Douglas and Peel; in 1874 to Castletown and the south; and in 1879 to Ramsey—all on the narrow-gauge system.

Previous to the 6th c., the history of the Isle of Man is involved in obscurity; from that period, it was ruled by a line of Welsh kings, until near the end of the 9th c., when the Norwegian, Harald Haarfager, invaded and took possession of the island. According to tradition, in the beginning of the 10th c., Orry, a Dane, effected a landing, and was favorably received by the inhabitants, who adopted him as their king: he is said to

have been the founder of the present Manx constitution. A line of Scandinavian kings succeeded, until Magnus, king of Norway, ceded his right in the island and the Hebrides to Alexander III. of Scotland, 1266 A.D.; this transference of claim being the direct result of the disastrous failure of the expedition of Hacon of Norway against the Scots in 1263. On the death of Alexander, the Manx placed themselves under the protection of Edward I. of England by a formal instrument dated 1290 A.D.; on the strength of this document, the kings of England granted the island to various royal favorites from time to time, until the year 1406, when it was granted to sir John Stanley in perpetuity, to be held of the crown of England, by rendering to the king, his heirs, and successors, a cast of falcons at their coronation. The Stanley family continued to rule the island under the title of kings of Man, until James, the 7th earl of Derby, adopted the humbler title of lord, on his accession to the government. In 1651 the island was surrendered to a parliamentary force by receiver-general Christian, who had raised an armed body against the government, which was then in the hands of the countess of Derby: the parliament having thus obtained possession of the island, granted it to Thomas lord Fairfax. On the restoration, the Derby family were again put in possession. On the death of James, 10th earl of Derby, without issue, in 1735, James, 2d duke of Athol, descended from Amelia Sophia, youngest daughter of James, the 7th earl of Derby, became lord of Man. The Isle of Man having been for a long period the seat of an extensive smuggling-trade, to the detriment of the imperial revenue, the sovereignty of it was purchased by the British government, in 1765, for £70,000 and an annuity of £2,000 a year, the duke still retaining certain manorial rights, church patronage, etc. After negotiation and sales from time to time, the last remaining interest of the Athol family in the island was transferred to the British crown by John, the 4th duke, in Jan., 1829; the amount paid for the island having amounted in the aggregate to £493,000.

The Isle of Man forms a separate bishopric under the title of Sodor and Man. The bishopric of the Sudoreys, or Southern isles, was for a time annexed to Man, hence the title of Sodor, which is still retained, the name having been applied to the islet of Holm Peel, on which the cathedral church of the diocese stands. This bishopric is said to have been founded by St. Patrick in 447. The Manx church has its own canons, and an independent convocation. The see is, for certain purposes, attached to the province of York. There are in the island about 30 places of worship in connection with the established church of Man. The livings are, with few exceptions, in the gift of the crown. The principal denominations of dissenters are represented in the island.

The Isle of Man has a constitution and government of its own, to a certain extent independent of the imperial parliament. It has its own laws, law-officers, and courts of law. The legislative body is styled the court of Tynwald, consisting of the lieut.gov. and council—the latter being composed of the bishop, attorney-general, two deemsters (or judges), clerk of the rolls, water bailiff, archdeacon, and vicar-general—and the house of 24 keys, or representatives. A bill is separately considered by both branches, and on being passed by them, is transmitted for the royal assent; it does not, however, become law until it is promulgated in the English and Manx languages on the Tynwald Hill. The house of keys was formerly self-elective; but in 1866 an act was passed establishing an election by the people every seven years, the electoral qualification being, in the country, £12 yearly value occupation, or £8 proprietary; and £8 proprietary or tenancy in the towns.

The ancient arms of Man were a ship with her sails furled; in 1270 the present arms were substituted, viz., *gules*, three legs of men in armor, conjoined in fesse at the upper part of the thighs, flexed in triangle, garnished and spurred, *or*, with the motto on garter surrounding, *Quocunque jeceris stabit.*

See *The Isle of Man, its History*, etc., by the rev. J. G. Cumming, M.A., F.G.S.; *History of the Isle of Man*, by Joseph Train, F.S.A. Scot.; *Brown's Popular Guide;* and the works published by the Manx society.

MANIS'SA (anc. *Magnesia ad Sipylum*), a t. of Asia Minor, on the s. bank of the Sarabat (*Hermus*), 28 m. n.e. of Smyrna. It abounds in handsome public buildings. Silk and cotton manufactures are carried on. Population variously stated at 35,000 and 60,000. The ancient Lydian Magnesia is famous for the victory of the Romans under Scipio over Antiochus III. of Syria. There was another Magnesia in ancient times, not far from this one, generally called *Magnesia ad Mæandrum.*

MANIS'TEE, a co. of Michigan, having lake Michigan on the w., drained by the Manistee river; 550 sq.m.; pop. '80, 12,533. It is a level region, heavily timbered with pine, and with a fertile soil. The productions are wheat, hay, Indian corn, oats, potatoes, and butter. Co. seat, Manistee.

MANIS'TEE, a city in w. Michigan, incorporated 1869; situated at the mouth of the Manistee river on the shore of lake Michigan; pop. '70, 4,894. It is 45 m. s.w. of Traverse City, 72 m. n. of Muskegon, and 135 m. n.w. of Lansing. It has a prosperous community engaged in farming, and also in the manufacture of lumber, which is exported at the rate of 200,000,000 ft. annually. On the e. is lake Manistee, through which the river finds its outlet, the length of the river from this lake to lake Michigan being 1¼ m., and navigable by vessels of light draught. It has about 20 steam saw-mills

on lake Manistee manufacturing great quantities of shingles, laths, pickets, etc. It has machine-shops, grist-mills, and a tannery. It contains 6 churches, excellent public schools (one building for educational purposes costing $18,000), a court house, and a town-hall. Seat of justice, Manistee.

MANITOBA, RED RIVER, or SELKIRK, SETTLEMENT, was a colony in British North America (of which the chief part is now known as MANITOBA), lying along the Red river of the north. In 1811 the earl of Selkirk, a member of the Hudson's Bay company, attracted by the fertility of the soil on the banks of the Red river, obtained from the company a grant of a large tract of land on both banks of the river, extending some distance within the present frontier of the United States. Next year he brought out a number of settlers from the highlands of Scotland. The right of the Hudson's Bay company to grant this land was, however, disputed by the Northwest company; and when the settlers commenced to build, they were driven off by the servants of the Northwest company. Hostilities continued between the servants of the two companies for several years, and in 1816 there was a pitched battle between them. The earl of Selkirk arriving soon after found his settlers scattered; but by his energetic measures, and by help of 100 disbanded soldiers from Europe whom he had brought with him, he secured for his old and new protegees a peaceful settlement. They established themselves near fort Garry, and in 1817 the earl obtained from the Indians a transfer of their right to the land two miles back from the Red river on both sides. Still the settlers had some difficulties to overcome, especially from visitations of grasshoppers. These were gradually surmounted; but the population, including now a large number of half-breeds, remained very isolated, having little communication with the outside world.

In the year 1869 the Hudson's Bay company surrendered all their claims to the northwest territory to the British government, which in the following year transferred that territory to Canada. The Canadian government now organized that portion of the Red river district between long. 96° and 99° w. and lat. 49° and 50° 30′ n. as the PROVINCE OF MANITOBA. Its area is about 14,000 sq. miles. The Red river valley is a level plain or prairie, with a soil unsurpassed in fertility by any in the world. It consists of from two to four feet of rich black mold, resting on a marly clay which elsewhere would itself be reckoned good soil. In places the ground has been cropped for fifty years without any apparent diminution of its fertility. The surface was generally treeless and ready for the plow, though a few miles to the eastward the country was wooded. The rich natural grasses of Manitoba afford a very favorable pasture for cattle. At the time of the transfer, the population was about 12,000. Since then there has been a steady influx of immigrants from the eastern provinces, from Britain, from the United States, from Iceland, and elsewhere. In 1879 the population of the province was calculated at 75,000. Trade has increased; saw-mills and flour-mills have been established. The seat of government is at fort Garry, now called Winnipeg, a town of near 10,000 inhabitants in 1879. The university of Manitoba, at Winnipeg, embraced the college of St. Boniface (Roman Catholic), St. John (Episcopal), and Manitoba (Presbyterian). Provision has already been made for common schools throughout the province.

The province is represented in the senate of the dominion by two members, and in the house of commons by four. The government of Manitoba consists of a lieutenant-governor, appointed by the dominion government; an executive council of five members; and the legislative assembly of twenty-four members, the province being marked off into that number of divisions. While the proposed transfer to the British crown of the Hudson's Bay company was pending, this portion of their dominions was the scene of considerable contention and violence. The French-speaking population, led by Louis Riel, organized a force, imprisoned their English and Scotch opponents, seized fort Garry, established a provisional government, robbed the strong-box, and dictated terms to the governor of the Hudson's Bay company, to which he had to submit. A military force arrived in the province July, 1870, and Riel, fearing capture, escaped, an event which put an end to the insurrection.

MANITOBA (*ante*). A considerable portion of this province is prairie-land, diversified by patches of elm, ash, oak, poplar, and maple. The soil is a rich black mold, producing from 20 to 25 bushels of wheat to the acre, the grain ripening in 110 days. It produces also oats, barley, corn, hops, flax, hemp, potatoes, and all kinds of garden vegetables. The savannas of the Red river afford excellent pasturage. The winter climate, though severe, is declared to be milder than that of the Red river valley, farther south. The short summers are very warm. The climate, on the whole, is healthful. The Red river is valuable for navigation, except when it overflows its banks and inundates the surrounding country. The Canadian Pacific railway has its course through the province. A large proportion of the inhabitants are Roman Catholics, that religion having been established at an early day by missionaries to the Indians. A Roman Catholic archbishop resides at St. Boniface, and the see-house of the Anglican lord-bishop of Rupert's Land is at fort Garry. The board of education is composed of equal numbers of Roman Catholics and Protestants. There is a considerable Scotch Presbyterian element in the population. St. John's college (Anglican), and St. Boniface college (Roman Catholic), were founded in 1872. The executive government consists of a lieutenant-governor and a council of five. The legislature is composed of a legislative council of

seven members, appointed for life, and of a legislative assembly of 24 elective members. The public business is carried on in both the English and French languages. The common law of England is in force in the province.

MANITOBA, LAKE a body of water in the n.w. territories of Canada, instersected by the 51st parallel and 99th meridian. It is about 60 m. s.w. of lake Winnipeg, which receives its waters through the Saskatchawan or Dauphin river, which, near the middle of its course, expands into St. Martin's lake. Manitoba lake is about 120 m. long, and about 25 m. wide; area, about 1900 sq. miles. It is 40 ft. higher than lake Winnipeg, and navigable for vessels drawing 10 ft. of water, It abounds in fish. At its northern end it receives the waters of several smaller lakes, and at the s. those of the White Mud river. The name, in the Indian dialect, signifies "supernatural strait," the Indians attributing what they regarded as the peculiar agitation of the water in some places to the presence of a spirit.

MAN'ITOU, a name used among most Indian tribes to denote any object of supernatural fear or worship. It somewhat resembles in this the Greek *dæmon*, which meant either a good or evil spirit. The great spirit, or *gitche Manitou*, does not correspond with our idea of a personal God. Any article, as a charm, connected with Indian superstitions is also designated by the same term, just as Africans use the word *fetich* for idols, amulets, or rites.

MAN'ITOU, a co. in Michigan, comprising islands in lake Michigan, 100 sq. m.; pop. '80, 1334. The islands included, and which lie off the coast of the lower peninsula, are the Big Beaver, Great and Little Manitou, Little Beaver, Garden, Hog, South and North Fox. These islands have a rugged surface, and are not very fertile. Co. seat, St. James.

MANITOU'LIN ISLANDS—comprising Grand Manitoulin, or Sacred isle; Little Manitoulin, or Cockburn isle, belonging to Britian; and Drummond isle, belonging to the state of Michigan—are situated in lake Huron, from whose northern shore they are separated by a channel varying from 7 to 18 m. in breadth. Grand Manitoulin is 90 m. long by 5 to 30 broad; Little Manitoulin is circular in shape, and has a diameter of 7 m.; Drummond isle is 24 m. long by from 2 to 12 broad. All are irregular and striking in their natural features, and the Grand and Little Manitoulin are covered with large and dense forests of pine. Pop. '71, 2,011, of whom 1562 were Indians.

MANITOWOC', a co. in e. Wisconsin, on lake Michigan, drained by the Sheboygan, Manitowoc, and East and West Twin rivers; 612 sq.m.; pop. '80, 37,506. The soil is productive, yielding largely of wheat, rye, oats, barley, potatoes, hay, peas, and beans. Other productions are wool, butter, and pine lumber, the latter being the most important article of export. There are a large number of flour, saw, and woolen mills, besides tanneries, breweries, and currying establishments. Co. seat, Manitowoc.

MANITOWOC', chief city in Manitowoc co., in e. Wisconsin, at mouth of the river of the same name and on the Milwaukee, Lake Shore and Western railroad. Its pop. is 5,168, largely German; has a bank, 4 newspapers, tan-yards, factories, and some lake commerce.

MANKA'TO, chief city in Blue Earth co., Minnesota; is 86 m. from St. Paul, on the St. Paul and Sioux City railroad; pop. '70, 3,482. It is also the terminus of the Central road, and is on the Missouri river; has 3 banks, 4 newspapers, a library, state normal school, 8 or 10 manufactories, and a good general trade.

MANLEY, JOHN, 1734–93; b. at Torbay, England; bred a sailor in the maritime service. He soon became a resident of Marblehead, Mass. At the opening of the revolution he was placed by Washington in command of the schooner *Lee*, in which he did good service, seizing several vessels, one of which was of great value. In 1776 he received a regular commission from congress. His first capture in the *Hancock*, his new command, was the man-of-war *Fox*. Owing to cowardly conduct by his consort, capt. McNeil of the *Hector*, capt. Manley was taken by the British man-of-war *Rainbow*, on July 8, 1777. He was tried for his conduct in this affair and honorably acquitted. The last naval combat of the war was between the *Hague*, capt. Manley, and four British men-of-war, the former having been driven on a sand-bank at Guadeloupe. Here for three days Manley defended himself against the tremendous odds and finally effected his escape. After the war his home was at Boston, where he died.

MANLIUS. The Roman family whose members bore this name had many famous representatives, of whom may be noted. 1. MARCUS MANLIUS CAPITOLINUS, who was consul in 392 B.C., and two years later gained his surname by rescuing the capitol from the attacks of the Gauls. From this time forward he courted the favor of the lower classes, and in 381 was arraigned before the centuries and sentenced to be thrown from the Tarpeian rock. The name of Marcus was never after borne by any of the Manlian gens, who considered him a traitor to his family and class. 2. LUCIUS MANLIUS IMPERIOSUS, dictator B.C. 361. 3. TITUS MANLIUS TORQUATUS, son of Lucius, military tribune B.C. 359, twice dictator and three times consul. His surname was derived from his having despoiled a gigantic Gaul of a golden chain (*torques*) after having slain him in single combat. In his last consulship he waged a successful war against the Latins and

caused to be put to death his own son, who had disobeyed his orders by engaging in single combat with the enemy. 4. TITUS MANLIUS TORQUATUS was consul in 235 B.C., and in 224. In that year he defeated the Gauls and crossed the Po, and soon afterwards was victorious over the Carthaginians. He was again elected consul in 210 B.C., but declined the honor. 5. CNEIUS MANLIUS VULSO, consul B.C. 189, after having been prætor in 195 and curule ædile in 197 B.C. He was victorious over the Gauls of Galicia and in Asia, but, on account of a serious defeat when returning through Thrace, with difficulty obtained the honor of a triumph.

MANLY, BASIL, D.D., 1798–1868; b. near Pittsborough, Chatham co., N. C.; graduated at the South Carolina college in 1821; preached in the Edgefield district for three years; pastor of the Baptist church in Charleston 1826–37; president of the university of Alabama 1837–55. Resigning on account of failing health, he took charge of another church in Charleston, which he subsequently left and became a traveling missionary in Alabama. He took an active part in the organization of the southern Baptist convention in 1845, and in the establishment of the theological seminary at Greenville, S. C., in 1858. He published a *Treatise on Moral Science*, which has been a text-book in southern colleges.

MANN, A. DUDLEY, b. Va., 1805; was a commissioner of the United States to negotiate commercial treaties with Hanover, Oldenburg, and Mecklenburg in 1845, and with all the minor German states in 1847; special commissioner to the insurgent government of Hungary in 1849; minister to Switzerland in 1850; private secretary to president Pierce in 1853, but resigned in a few months to devote himself to the development of the material resources of the southern states. In 1861 he was sent on a special mission to induce the European governments to recognize the confederacy, and was afterwards associated for the same purpose with Messrs. Mason and Slidell.

MANN, HORACE, LL.D., American statesman and educationist, was b. at Franklin, Mass., May 4, 1796; graduated at Brown university, Providence, and commenced the study of law. Elected to the legislature of Massachusetts in 1827, his first speech was in favor of religious liberty, and his second a plea for railways. He was an advocate of temperance, and a founder of the state lunatic asylum. Removing to Boston, he was elected, 1836, to the state senate, of which he became president. After editing the revised statutes of the state, he was for 11 years secretary of the board of education. He gave up business and politics and devoted his whole time to the cause of education, introduced normal schools and paid committees, and, in 1843, made a visit to educational establishments in Europe. His report was reprinted both in England and America. For 11 years he worked 15 hours a day, held teachers' conventions, gave lectures, and conducted a large correspondence. In 1848 he was elected to congress as the successor of ex-president John Quincy Adams, whose example he followed in energetic opposition to the extension of slavery. At the end of his term he accepted the presidency of Antioch college at Yellow Springs, Ohio, established for the education of both sexes, where he labored with zeal and success until his death, Aug. 2, 1859. His principal works are his educational reports, and *Slavery, Letters, and Speeches.*

MANNA, a species of sugar which exudes from incisions made in the stems of the manna ash (see ASH), a native of the mountainous parts of southern Europe. Sicily is the chief locality of the manna, and there, in July or August, the collectors make a deep cut through the bark to the wood near the base of the tree with a curved-bladed knife, repeating such incisions daily in different places, always, however, on one side only, and gradually rising until the branches are reached, and then some of the largest are also cut. The following year the other side of the tree is operated upon, and this alternation gives the bark time to heal. If the weather is warm and favorable the manna begins to ooze out of the cuts slowly, and to harden in lumps or flakes, which are from time to time removed by the collectors. Manna is a light porous substance, of a yellowish color, not unlike hardened honey, but harder and drier. There are various qualities known in commerce, according to the time of collection, the goodness of the season, and other causes. It is chiefly used in medicine, having a gentle purgative effect, which renders it valuable for administration to very young children. It consists principally of a crystallizable sugar called *mannite*, and an uncrytallizable sugar, which possesses the sweet and purgative properties. There are several other manna-yielding plants besides the ash, especially the manna-bearing eucalyptus of Australia (*eucalyptus mannifera*), which is non-purgative, and is a favorite sweetmeat with the children of that country.

Small quantities are found on the common larch (*larix Europæus*), in some districts; this kind is known under the name of manna of Briançon. Manna is also obtained in minute quantities from various mushrooms, and from the fronds of some sea-weeds.

The manna of the Israelites, which they ate during their wanderings in the wilderness, appears probably, as shown by Ehrenberg in his *Symbolæ Physicæ* (Fasc. i. 1823), to have been the saccharine substance called *Mount Sinai manna*, which is produced in that region by a shrub, *tamarix mannifera*, a species of tamarisk (q.v.), from the branches of which it falls to the ground. It does not, however, contain any mannite, but consists wholly of mucilaginous sugar. The exudation which concretes into this manna is caused by the punctures made in the bark by insects of the genus *coccus* (*C. manniparus*), which sometimes cover the branches. It is a kind of reddish syrup, and is eaten by the Arabs

and by the monks of Mount Sinai like honey with their bread. It has been very generally supposed that the manna of the Jews was produced by a species of camel's thorn (q.v.).

MANNA CROUP, or MANNA GROATS, a kind of semolina, prepared in Russia, usually from the hard wheats of Odessa and Taganrog. In the process of grinding for flour, small rounded fragments of these hard grains are obtained from the grooves of the grinding-stones, and these constitute the ordinary manna groats, which forms one of the most esteemed materials for puddings. It is undistinguishable from the semolina of Italy. Another kind is made by husking the small grain of the aquatic grass, *glyceria fluitans*, which is carefully collected for the purpose; it is expensive, and is only used as a luxury. Small quantities of the commoner kind are occasionally imported for use in this country, but it is by no means sufficiently well known.

MANNA GRASS, *Glyceria fluitans*, or *Poa fluitans*, a grass plentiful in marshes, ditches, and by the sides of stagnant pools in Britain, and most parts of Europe; found also in Asia, North America, and New Holland. It is also known as *flote fescue*, *floating sweet meadow grass*, etc. It varies in height from one foot to three ft., and has a long, slender, nearly erect panicle, the branches of which are at first erect and appressed to the rachis; the spikelets awnless, slender, cylindrical, an inch long or nearly so, with 7 to 20 florets; the glumes small, unequal, and obtuse; the outer paleæ with seven prominent ribs and a membranous margin; a scale of one thick fleshy piece. The stems are decumbent at the base, and rooting at the joints; the leaves long and rather broad, the lower ones often floating. Manna grass is perennial, and useful in irrigated meadows and in very wet grounds, affording large quantities of food for cattle. In many parts of Germany and Poland, the seeds—which fall very readily out of the spikelets—are collected by spreading a cloth under the panicles and shaking them with a stick; they are used in soups and gruels, are very palatable and nutritious, and are known in shops as *Polish manna*, *manna seeds*, and *manna croup* (q.v.). They are a favorite food of geese, and are also eagerly devoured by carp and other kinds of fish.—Akin to this grass is the reed meadow grass, water meadow grass or reedy sweet water grass (*glyceria* or *poa aquatica*), a still larger grass, with very abundant herbage, the most productive, indeed, of all British fodder grasses, growing in ponds, ditches, marshes, and the sides of rivers, often where they are tidal. Hay made of it is greatly preferred to that of other bog grasses. Its rapid growth often chokes up water-channels, so that they must be cleared of it.

MANNERS, THE FAMILY OF. This noble family are of Northumbrian extraction, their ancestor, sir Robert de Manners, having been lord of the manor of Ethale, or Etal, in that county in the 13th century. His descendant, also sir Robert de Manners, temp. Edward III., was governor of the important border fortress of Norham castle, which he defended with ability against the Scots, and was subsequently commissioned to treat, on part of the king, with David Bruce, concerning the ratification of peace. In the reign of Henry VI., we find another sir Robert de Manners acting as sheriff of Northumberland, and representing that county in parliament; a post at that time, as sir B. Burke remarks, of great power and profit. His wife, a daughter of the noble house of Roos, or De Roos, brought to him that ancient barony, and with it the castle of Belvoir, Leicestershire; the grandson of this marriage was raised to the earldom of Rutland by Henry VIII.; and the tenth earl was raised to the dukedom in 1603. The eldest son of the third duke was the celebrated marquis of Granby (q.v.), who attained a very high reputation as a field-officer whilst acting as commander-in-chief of the British forces serving under prince Ferdinand in Germany, but who did not live to inherit the dukedom. The marquis's youngest brother having married the heiress of Sutton, lord Lexington, assumed the additional name of Sutton, and became the father, *inter alios*, of two sons, one of whom was for many years archbishop of Canterbury, and the other held the high post of lord chancellor of Ireland early in the present century, whilst the archbishop's son presided as speaker over the councils of the house of commons. The present heir-presumptive to the dukedom of Rutland is *lord John James Robert Manners*, son of the late and brother of the present duke.

MANNERS, JOHN. See GRANBY, *ante*.

MANN'HEIM, formerly the capital of the Rhenish palatinate, now the most important trading town in Baden, and, after Cologne and Coblentz, the most important on the Rhine, is situated in a fertile plain, on the right bank of the Rhine, at the junction of the Neckar, about 18 m. below the city of Spires. The site of the town is low, and a high dike protects it from inundations. A bridge of boats crosses the Rhine, which is here 1200 ft. in breadth, and a chain bridge the Neckar. The town is remarkable for its cleanliness and regularity, the whole of it being laid out in quadrangular blocks. Its fortifications were destroyed after the peace of Lunéville, and gardens now occupy their place. The palace, built 1720–29 by the elector palatine Karl Philipp, is one of the largest buildings of the kind in Germany. The city contains a lyceum with a library, a botanic garden, an observatory, etc. Tobacco, shawls, linen, and playing-cards are manufactured, and there are several tanneries and bleach-works. A thriving trade is carried on chiefly by boats on the Neckar and Rhine. About 6,600 vessels, of

270,000 tons, enter and clear the port annually. Mannheim is connected by railway with the chief towns of Germany. Pop. '71, 39,614.

Mannheim was a mere village till the beginning of the 17th c., when a castle was built by the elector palatine Frederick IV., around which a town grew up, chiefly peopled by exiles for religion from the Netherlands. It was several times taken and retaken during the wars of the 17th c., totally destroyed by the French in the end of that century, rebuilt, and strongly fortified.

MANNING, HENRY EDWARD, Cardinal, b. July 15, 1808, at Totteridge in Hertfordshire, England; was educated at Harrow school and Balliol college, Oxford, where he took orders in the church of England. In 1834 he was presented to the living of Lavington and Graffham in Sussex co., and in 1840 was appointed archdeacon at Chichester, the cathedral town. Up to this time he was a consistent high-church Anglican, though, like many Oxford divines, inclined to Puseyism; but in 1851 the decision of the courts in the noted Graham case, which seemed to Manning and others to claim for the crown authority over a purely doctrinal question on the subject of baptism, left him, he thought, no alternative but to abandon his preferment and become a member of the Roman Catholic church. It was thought by many that this would prove the beginning of a serious movement toward Rome on the part of a large section of the Anglican church. For three years he studied the dogmas and rites of his new faith at Rome, and in 1857 was ordained by cardinal Wiseman and became priest of the parish of St. Helen and St. Marys. In 1865 he was nominated archbishop of Westminster, and other ecclesiastical honors were conferred upon him. He has always been particularly energetic in the matter of public education; in 1874 was opened the Kensington university (Roman Catholic), in the founding of which he had been for several years concerned. Perhaps more than any other dignitary of his church, he has been active in providing primary education for the masses. The cardinal's hat was conferred upon archbishop Manning by Pius IX in Mar., 1875. In the Vatican council of 1869–70 he took a prominent part, sustaining the extreme advocates of infallibility; and his controversy on the subject with bishop Dupanloup was one of the prominent features of that time. *Petri Privilegium* (1871) is an exposition of the doctrine and an account of the proceedings. On the same subject he has also published answers (1875) to Mr. Gladstone's expostulation, giving his views of the bearing of the Vatican decrees on civil allegiance. Besides these works he has published sermons and numerous pamphlets on ecclesiastical subjects and on the condition of Ireland, in the government of which he has long advocated reform. Among these are: *Unity of the Church* (1842), *Temporal Mission of the Holy Ghost* (1865), *Temporal Power of the Pope* (1866), *England and Christendom* (1867). The cardinal is a man of great keenness of intellect, firmness of purpose, and fervor of spirit.

MANNING, JACOB MERRILL, D.D., b. Greenwood, N. Y., 1824; graduated at Amherst college in 1850, and at Andover theological seminary in 1853. In 1854 he was settled as pastor of a Congregational church in Medford, Mass., but resigned in 1857 to become associate pastor of the Old South church in Boston, where he still (1881) remains, being now the sole pastor. He has been a contributor to the *Bibliotheca Sacra;* was the orator of Boston, July 4, 1865; and has published *Truths and the Truth* and *Helps to a Life of Prayer*. His discourses and writings show a strong and clear intellect, with a finished literary taste.

MANNING, JAMES, D.D. 1738–91; b. Elizabethtown, N. J.; graduated at Princeton college in 1762; became pastor of a Baptist church in Morristown, N. J., in 1763, and soon afterwards in Warren, R. I. In 1763 he proposed to some prominent Baptist gentlemen of Newport the formation of a "seminary of polite literature, subject to the government of the Baptists," and prepared a plan for the institution. The neccessary money was raised, and a charter obtained in 1764. In 1765 Mr. Manning, but 27 years of age, was appointed "president and professor of languages and other branches of learning, with full power to act in these capacities, at Warren or elsewhere." The college, first called Rhode Island college, was opened at Warren in 1766, and in 1770 removed to Providence. In connection with the presidency, he was pastor of the First Baptist church. During the revolution, when the college was occupied as a military barrack and afterwards as a hospital, Manning continued his duties as pastor and used his influence in behalf of his country. In 1783 he resumed his duties as president, and in 1786 was elected to congress, still retaining his connection with the college. While in congress he took an active part in the adoption of the national constitution. He resigned the presidency in 1790. Dr. Manning may be regarded as the founder of the college, though the plan was suggested by an association of ministers in Philadelphia. He was distinguished as a pulpit orator, possessing, according to his biographer, "a most attractive and impressive exterior, a voice of extraordinary compass and harmony, and manners expressing remarkable dignity and grace." The name of the college was changed to Brown university, in 1804 in honor of Nicholas Brown its liberal benefactor.

MANNING THE NAVY. Until a recent date sailors only engaged themselves for the term a certain vessel should be in commission, which there was a tacit understanding would be about five years. When the captain hoisted his pendant, the men came down and volunteered, or the crimps in some manner made it their interest to produce them. When the captain was a popular officer or noted for his daring, his crew was soon com-

pleted; while, when his reputation was that of a martinet, or of a commander under whom prize-money would probably be scarce, a ship would often lie for weeks, or even months in harbor, while the authorities sought in vain to provide her complement of men. In the Napoleonic and former wars, when seamen were urgently needed and knew their value, the press-gang was resorted to, and vacancies filled by compulsion. See IMPRESSMENT.

At present seamen are encouraged by contingent advantages to enlist for a specified number of years, at the end of which they become entitled to permanent pension. On the paying off of their ship, these men are granted liberal leave, after which they join a depot, and are thence drafted to some other vessel in which their services are required. As a reserve for times of emergency, there are the royal naval coast volunteers (see COAST VOLUNTEERS), and the royal naval reserve (q.v.), both very important auxiliaries, of which the value became instantly apparent when hostilities with the United States were anticipated in 1861.

The Dutch, Danish, and Swedish navies are mainly manned by volunteers, as is that of the United States. The navies of France, Russia, and Italy are manned by conscripts levied in the maritime provinces of the respective countries. The German ships of war depend on the law of compulsory service for their complement.

MANNING THE YARDS, in a practical sense, consists in sending sufficient men aloft and on to the yards to furl or unfurl the sails: in a complimentary sense, the yards are said to be manned when a row of sailors, with their hands touching, are ranged along them, standing on the yard itself, and holding to a rope which runs across about breast-high between the lifts. When the men are all in clean white uniforms the act of manning the yards has a singularly lively and picturesque effect. It is resorted to when any great personage passes by the ship or comes on board, or in commemoration of some great event; but as the operation is attended with considerable and unnecessary danger, it is, under present regulations, performed far more rarely than used to be the case.

MANNITE. See MANNA.

MANNITE, or MUSHROOM SUGAR ($C_{12}H_{14}O_{12}$), is a peculiar saccharine matter which forms the principal constituent of manna (q.v.); it is also found in several kinds of fungi, in asparagus, celery, onions etc. It is most readily obtained by digesting manna in hot alcohol. On cooling the filtered solution, the mannite is deposited in crystals, which are very soluble in water, and possess a sweet taste. It is not susceptible of alcoholic fermentation, and may be readily distinguished from cane and grape sugar by simple tests. Heated with hydrate of potash, it gives a mixture of acetate, formate, and valerianate of potash, hydrogen being evolved.

MANNUS, according to Tacitus, the name given by the Germans to the son of the earth-born god *Tuisco*. From his three sons they derived their three great tribes, the *Ingavones*, the *Iskavones*, and the *Herminones*. Mannus belongs, not to the Teutonic people alone, but to the great mythus of the origin of the human race, common to the whole Aryan family, and, like the Hindu *Manu* or *Manus*, stands forth as the progenitor of the inhabitants of earth endowed with reason. The name is derived from the Aryan root *man*, to think. Compare Wackernagel in Haupt's *Zeitschrift für Deutsches Alterthum* (Bd. 6).

MANOËL, Don FRANCESCO, the most eminent of modern Portuguese lyric poets, was born at Lisbon in 1734, and devoting himself to the pursuits of literature, acquired a high reputation. The hostility of the inquisition compelled him, however, to abandon his native country. He took up his residence at Paris, where he died, 25th Feb., 1819. There are more editions than one of his *Obras Completas*. His odes are highly esteemed.

MAN OF SIN, an expression used by the apostle Paul in 2. Thess. ii. 3, and which is variously interpreted. The Roman Catholics assert that the *Man of Sin* is Antichrist. The Puritans applied the term to the pope of Rome; the fifth-monarchy men to Cromwell, and some modern theologians consider it as indentical with that "wicked one" referred to in v. 8 by the apostle, who is to appear immediately before the second advent of Christ, whom he will destroy with the "spirit of his mouth" and the "brightness of his coming."

MAN-OF-WAR, an expression, of unknown origin, for an armed vessel carrying cannon, and belonging to some constituted and acknowledged government. As such she possesses the privileges of war: her deck is, by a legal fiction, taken to be a portion of the soil of the nation whose flag she hoists; in time of war she is justified in attacking, sinking, burning, or destroying the ships and goods of the foe, and by the law of nations, she may stop and search the merchant-vessels of neutral powers which she suspects of carrying aid to her enemy. See CONTRABAND. In case of being overpowered, the crew of a man-of-war are entitled to the ordinary mercy granted to vanquished combatants, lawfully fighting. Any vessel making war, but not belonging to an acknowledged government, is either a privateer (see LETTER OF MARQUE) or a pirate (see PIRACY).

MAN-OF-WAR BIRD. See FRIGATE BIRD.

MANOM'ETER (Gr. *manos*, thin, rare) is properly an instrument for measuring the rarity of the air or of other gases; but the name is most frequently applied to instruments for indicating the elastic force of gases, which is always inversely proportional to their rarity. The several kinds of barometers (q.v.) are really manometers, and so is the steam-gauge of a steam-engine (q.v.).

MANOM'ETER (*ante*). The various forms of manometer may be classified under three heads: 1, the open-air manometer, on the principle of the barometer; 2, the confined-air manometer, on the principle of Mariotte's instrument (q.v.); and 3, the metallic-spring manometer. A simple open-air manometer consists of a glass tube, open at both ends, placed upright in a strong bottle of glass or iron, the bottom of which contains mercury. The tube passes through a tight packing box in the neck. In the upper part of the bottle there is an orifice which admits compressed air, acted upon by steam or vapor, whose tension it is desired to measure. But this form cannot be used for high pressures. The multiple-branch manometer is a modification of the simple open instrument, and is constructed by bending a long tube, open at both ends, in a series of V-shaped flexures of from 20 to 40 in. in height, the number of flexures depending upon the pressure the instrument is liable to be subjected to. Columns of mercury, of equal height, being placed in the lower halves of the V-shaped legs, will indicate the pressure excited at one end of the tube, by the sum of the excess of height of the mercurial columns in alternate legs, or by multiplying the excess of height in one leg by the number of legs containing such excess. The system is fastened to a board or metallic plate, which at one side, near the last branch, is furnished with a graduated scale. The compressed-air manometer is simply a strong V-shaped tube closed at one end, while at the other is attached the pipe communicating with the gas or vapor whose tension it is desired to measure. A portion of the flexure of the V contains mercury, and the space between it and the closed end is filled with common air. Now, according to Boyle's or Mariotte's law, a pressure exerted on the column of mercury sufficient to force the air into half the space it occupies at the normal atmospheric pressure, must become doubled, or 15 lbs. to the square inch must be added. Again, to compress the air into half the remaining space, 30 lbs., or double the pressure required for the reduction to the first half, must be added, making in all a pressure of four atmospheres for the reduction to one-fourth the original volume. It is evident, therefore, that a graduated scale, to exhibit the degrees of pressure, must have its spaces decrease from below upwards. The graduation is accomplished by means of an open-air multiple manometer. The metallic-spring manometer consists of an index traversing a graduated arc, and having applied to a spring connected with it—which may be in the form of a spiral—a piston actuated by the force of the gas or vapor in the boiler or steam-chamber.

MANOR, in English law, is a freehold estate held by the lord of the manor, who is entitled by immemorial custom to maintain a tenure between himself and the copyhold tenants, whereby a kind of feudal relation is kept up between them. As, however, subinfeudation in England was prohibited by the statute of *quia emptores*, in the reign of Edward I., and no manor could be created since that date, it follows that all existing manors must trace their origin from before that time. Copyhold estates are thus a relic of ancient feudalism, and form an exception to the general rule in England, where freeholds form the highest kind of estate known to the law. See COPYHOLD. Manors closely resemble the feudal estate held in Scotland by all proprietors of land, who have to this day unlimited powers of subinfeudation, which they constantly act upon, and thus keep up a chain of vassals. See FEU.

MANRENT (more properly, MANRED), BONDS OF, agreements which used to be entered into in the Highlands of Scotland between the greater and lesser magnates, where protection on the one hand was stipulated in return for allegiance on the other. Such bonds were common up to two or three centuries ago, the royal authority being comparatively powerless to repress internal warfare among the fastnesses of the n. and west.

MANRE'SA, a t. of Spain, in the province, and 30 m. n.w. of the city, of Barcelona. It is situated in a fertile and well-irrigated district, on the left bank of the Cardonet. Manresa has manufactures of cotton and silk fabrics, broadcloths, etc. In 1811 it was set on fire by marshal Macdonald, when more than 800 houses, with churches and manufactories, were burned down. Pop. 15,264.

MANS, LE, a city of France, formerly capital of the province of Maine, now of the department of Sarthe, on the right bank of the river of that name, 132 m. s.w. of Paris by railway. The chief edifice is the cathedral, containing the tomb of Berengaria of Sicily, the queen of Richard Cœur de Lion. There is a public library of 50,000 vols., and several artistic and scientific institutions. The town manufactures wax-candles, woolens, lace, soap, and hosiery, and is famous for its poultry, of which it sends a large supply to the metropolis. It gives its name to a battle in the Franco-Prussian war of 1870–71, in which the French were defeated with the loss of 20,000 prisoners. Pop. '76, 45,709. Le Mans (anc. *Cenomani*) was, in the age of Charlemagne, one of the chief cities of the Frankish empire.

MANSARD ROOF, a form of roof invented by Francis Mansart, a distinguished French architect of the 17th century. It is constructed with a break in the slope of the roof so

that each side has two planes, the lower being steeper than the upper. The framework ought to be arranged so that its parts are in equilibrium. This kind of roof has the advantage over the common form of giving more space in the roof for living room.

MANSAROWAR, or MANSAHROR, LAKE, is situated on the n. side of the Himalaya mountains, which divide Hindustan from Thibet and Tartary, and is the source of the river Sutlej. It is 11 m. in breadth from n. to s., and 15 m. in length, and is supposed to have been formed in the crater of a volcano. It derives importance from the fact of its being an object of veneration on the part of both the Hindus and the Tartars. The former esteem it as the most sacred of all their various places of pilgrimage, and incur all kinds of hardships in the course of their endeavor to visit it from long distances. The Tartars regard it no less highly, and convey a portion of the ashes of their friends to its shores to be thrown into it. It is situated on an elevated plain covered with long grass, to the n. of which is a conical hill dedicated to Mahadeva.

MANSART', or MANSARD, FRANÇOIS, 1598–1662; b. France, of Italian origin. A thorough education, lively imagination, and horror of tinselry in architecture, led him, says his French biographer, from the over-decorated style of his time, to adopt a severity and heaviness of style that was even less pleasing. He was the artist of many creditable though not remarkable works, and is credited with the first adoption of the double-slope roof, in general use a hundred years ago, under the name of gambrel roof, and again came into fashion under the name of Mansard roofs since 1850; but with such bold and decorative modifications from the original form as hardly to be assigned to the original source.

MANSART', or MANSARD, JULES HARDOUIN, 1645–1708; b. in Paris, son of an obscure painter, who had married a sister of François Mansart. The uncle perceiving the talent of the nephew and his great industry, did all in his power to advance him, and with such success that the nephew, having assumed his uncle's name, soon became the most famous of the two; and being also a skillful courtier secured Louis XIV. for patron, and entered upon the construction of some of his most splendid works. The château de Clagny was his first work. The next was a château for Mme. de Montespan at Versailles. The extravagance and rage for palace building which possessed the king was turned to the greatest advantage by Mansart, both as an artist and a man of business. He accumulated an immense fortune, and was covered with dignities and honors. His pride, vanity, and envy soon made him the object of opposition and detraction, but he made good his place in the favor of the king. His enemies accused him of using the influence of the king's mistresses, and of making plain faults in his plans so that, the king seeing them instantly, he could turn the fact to compliment him on the remarkable quickness of his eye and justice of his taste with an air that made the king the dupe of his cunning. He was the architect of many noted châteaux before engaging in 1660 upon the palace of Versailles, which, monstrous as was its expense, has never been considered proportionately beautiful. The grand Trianon was his work; but his most perfect design is the dome of the church of the Invalides in Paris, which, though inferior to very many domes in size, surpasses all in the exquisite proportions of its exterior lines. The *place Vendôme* and the *place des Victoires* in Paris are also by Mansart.

MANSE, in Scotch law, is the designation of a dwelling-house of the minister of the established church, and in popular use the term is often applied generally to the dwelling-house of any minister of a dissenting congregation, though no legal right exists in the latter case. In the established church every minister of a rural parish is entitled to a manse, which the heritors or landed proprietors are bound to build and uphold; and he is also entitled, as part of the manse, to a stable, cow-house, and garden. The manse must, by statute, be near to the church. The usual sum allowed of late years to build a manse is £1000. It has often been made a question, how far the heritors can be compelled to rebuild a manse which, by time or other circumstances, has become inadequate. It is now held to be the law, that at least the presbytery has power to order sufficient alterations and additions, and they can order a visitation, and take estimates from skillful tradesmen, and decree what is necessary to be done. It is only the ministers of rural parishes that are entitled to a manse, and not ministers of a royal burgh where there is no landward district.

MANSEL, The Rev. HENRY LONGUEVILLE, B.D., Waynflete professor of moral and metaphysical philosophy in Oxford; was b. at Cosgrove, Northamptonshire, in 1820, his father being rector of the parish. He was educated at Merchant Taylors' school, and at St. John's college, Oxford; and graduated in 1843. In 1855 he was appointed reader in moral and metaphysical philosophy in Magdalen college; and in 1859 became Waynflete professor. In 1867 he received the appointments of regius professor of ecclesiastical history, and canon of Christ church, Oxford. His published works are: Aldrich's *Logic*, with notes (1849); *Prolegomena Logica* (1851); article *Metaphysics* in 8th edition of the *Encyclopædia Britannica* (1857), afterwards published separately; *Bampton Lectures—The Limits of Religious Thought* (1858); *The Philosophy of the Conditioned* (1866), in reply to Mill's *Review of Hamilton's Philosophy*. He was co-editor, with prof. Veitch, of sir William Hamilton's lectures.—Mr. Mansel is considered as belonging to the school of sir W. Hamilton. He was well versed in the erudition of metaphysical philoso-

phy, and wrote in a clear and elegant style. His *Bampton Lectures* occasioned much controversy, both theological and philosophical. See CONDITIONED. He died July 30, 1871.

MANSFELD, ERNST, 1585–1626; the illegitimate son of count Peter Ernst; educated by his god-father, archduke Ernst of Austria. In return for valuable military services under Rudolph II. the stigma of his birth was removed by decree of the emperor. The title and estates of his father were, however, refused, and in revenge he joined the enemies of Austria in the thirty years' war, and became a stanch Protestant champion. Under the elector Frederick he fought desperately in Bohemia and on the Rhine. His efforts failed, but they brought him great renown; and in 1625, aided by English subsidies, he again attacked Austria. Wallenstein met and overcame his force at Dessau, April, 1626. It was on the retreat which ensued after this defeat that he died.

MANSFELD, PETER ERNST, Count, 1517–1604; b. at the castle of Mansfeld in Prussian Saxony; for many years an officer of Charles V. and Philip II. of Spain. From 1552 to 1557 he was a French prisoner. After his release he was made governor of Luxemburg, and afterwards governor-general of the Netherlands. In 1594 he was given the title of prince and returned to Luxemburg, where he resided until his death.

MANSFIELD, a market t. of England, in the co. of Nottingham, and 14 m. n. of the town of that name, is surrounded by the remains of the ancient forest of Sherwood. It stands in the center of a large manufacturing and mining district, and contains, among other institutions, a royal free grammar school, with an annual income from endowment of £250. Silk, cotton, and doubling mills are in operation, and the corn and cattle markets are largely attended. Pop. '71, 11,824.

MANSFIELD, a t. in the s.w. part of Tolland co., Conn., on Willimantic river and New London Northern railroad. The main industry is the manufacture of sewing silk; pop. 2,401. It is the site of a soldiers' home.

MANSFIELD, a city in Richland co., Ohio; pop. 8,025. It is the junction of four railroads, of which the Atlantic and Great Western and the Pittsburg, Fort Wayne and Chicago are the most important. It has 7 hotels, 4 banks, 4 newspapers, an opera-house, public library, water-works, and many churches and schools. The manufacture of agricultural tools is a specialty, and the trade of the place is very heavy with the surrounding country, which is a productive farming region.

MANSFIELD, EDWARD D., LL.D., 1801–80; b. New Haven, Conn.; graduated at West Point in 1819, but declined to enter the army; and graduated at Princeton in 1822; studied law at the (then) Litchfield (Conn.) law school. After being admitted to the bar he removed to Cincinnati, and in 1836 became professor of constitutional law in the college there. Shortly afterwards, however, he abandoned the legal profession to engage in journalism, editing successively the Cincinnati *Chronicle*, *Atlas*, *Gazette*, and *Railroad Record*. He was commissioner of statistics for the state of Ohio from 1857 to 1867, and a member of the *société Française statistique universelle*. He was for several years a writer for the *New York Times* under the signature of "Veteran Observer." He published *Utility of Mathematics; Political Grammar; Treatise on Constitutional Law; Legal Rights of Women; Life of Gen. Scott; History of the Mexican War; American Education;* etc. Died in Cincinnati.

MANSFIELD, JARED, 1759–1830; b. New Haven; graduated at Yale college in 1777; became distinguished as a teacher and for his scientific acquisitions; was appointed in 1802 to a captaincy in the engineer corps of the army and assigned to duty at West Point as acting professor of mathematics. In 1803 he was appointed surveyor-general of the north-west territory and removed to Ohio, where he was employed in making the meridian lines on which is based the system of the public land survey. To accomplish this work he imported astronomical instruments from London, and established in his own house near Cincinnati the first observatory in the United States. In 1812 he returned to New Haven, and before the end of that year was appointed professor of natural and experimental philosophy at West Point. In 1828, after serving a term of 16 years, he resigned and returned to New Haven, where he died.

MANSFIELD, JOSEPH K. F., 1803–62; b. New Haven, Conn.; graduated at West Point in 1822, and entered the army as second lieut. of engineers. He was engaged in engineering duties on the Atlantic and Gulf coasts until 1846; in the war with Mexico he was chief engineer of gen. Zachary Taylor's army, distinguishing himself in the defense of fort Brown and in the battles of Monterey and Buena Vista, and being raised to the rank of col. by brevet. After the war he was for five years a member of the board of engineers for fortifications on the Atlantic and Pacific coasts; in 1853 he was appointed inspector-gen. of the army with the rank of col., which post he held until the breaking out of the rebellion, when he was placed in command of the department of Washington, and at once commenced the work of fortifying the capital. In Oct., 1861, he was transferred to camp Hamilton, Va., and in the month following to Newport News. He took part in the capture of Norfolk May 10, 1862, and commanded at Suffolk from June to September of that year, when he was assigned to the command of a division in the army of the Potomac, at the head of which, in the battle of Antietam,

he was mortally wounded, dying Sept. 18, 1862. Before assuming his last command he was promoted to be maj.gen. of volunteers.

MANSFIELD, MOUNT, in Cambridge, Vt., the highest elevation of the Green mountain range, being 4,348 ft. above the sea. It presents a grand appearance from all sides, and the view from the summit is one of the finest in New England. It commands a prospect of the Adirondacks on the w., the Green mountains on the s., parts of the White mountain range on the e., and the mountains surrounding Montreal on the north. In some states of the atmosphere lake Champlain also is visible. A wagon road leads to the summit on the eastern side, and there are accommodations for visitors at the top.

MANSFIELD, WILLIAM MURRAY, Earl of, lord-chief-justice of the king's bench, was the fourth son of Andrew, viscount Stormont, and was born at Perth, Mar. 2, 1704. He studied at Christ-church, Oxford, took the degree of M.A. in 1730, and was called to the bar in 1731. He soon acquired an extensive practice—mainly, it would seem, on account of his facility and force as a speaker, for neither then nor at any subsequent period of his career was he reckoned a very erudite lawyer—and was often employed on appeal cases before the house of lords. In 1743 he was appointed by the ministry solicitor-general, entered the house of commons as member for Boroughbridge, and at once took a high position. In 1746 he acted, *ex officio*, as counsel against the rebel lords, Lovat, Balmerino, and Kilmarnock; was appointed king's attorney in 1754; and at this time stood so high that, had not the keenness of his ambition been mitigated by a well-founded distrust of his fitness for leading the house, he might have aspired to the highest political honors. He became chief-justice of the king's bench in 1756, and entered the House of Lords under the title of baron Mansfield of Mansfield in the county of Nottingham. Still, his political *rôle* has little interest for posterity. As his opinions were not those of the popular side, he was exposed to much abuse and party hatred. Junius, among others, bitterly attacked him; and during the Gordon riots of 1780, his house, with all his valuable books and manuscripts, was burned. He declined, with much dignity, indemnification by parliament. In 1776 Murray was made earl of Mansfield. He worked hard as a judge till 1788, when age and ill-health forced him to resign. He died Mar. 20, 1793, in the 89th year of his age.

MANSFIELD VALLEY, a village of Alleghany co., Penn., 5 m. from Pittsburg, on Chartiers creek, and the Panhandle and Chartiers Valley railroad; pop. about 3,000. It has 5 churches, an academy, a newspaper, 3 savings banks, a smelting furnace, a glass factory, and an abundant supply of coal.

MANSLAUGHTER is, in Scotland, the offense of causing the death of a person by some carelessness or neglect. In England the offense is usually called culpable homicide.

MANSLAUGHTER (*ante*), the unlawful killing of another without malice, express or implied. Manslaughter is either voluntary, i.e., where there was an intent to commit the injury; or involuntary, where there was no such intent. It differs from murder in its absence of malice, and, as it is supposed to be committed in hot blood, no person can be an accessory before the fact. Among cases of homicide which constitute a manslaughter may be mentioned killing a person by gross negligence, though in the discharge of a lawful act; killing a person who has given great provocation; and killing an officer acting without or beyond his authority, though this may also be excusable homicide. The killing of an officer acting within his legal authority is murder. The provocation above-mentioned must be immediate, not remote; and though proof of provocation sufficiently repels the presumption of malice which the law attaches to every case of homicide, it is not sufficient to lower an offense from murder to manslaughter, if express malice be made out. In most of the United States manslaughter is divided into different degrees, punished with longer or shorter terms of imprisonment.

MANSTEIN, VON, a Prussian gen. who distinguished himself in the Franco-Prussian war of 1870. At the head of the 9th corps, in the army of prince Frederick Charles, he participated in the battle of Vionville. At Gravelotte, Aug. 18, 1870, he commanded the German center, and served throughout the campaign, retiring in 1873.

MANT, RICHARD, D.D., b. Southampton, Eng., 1776; educated at Winchester college, and Trinity college, Oxford, taking his bachelor's degree in 1797; was elected fellow of Oriel college in 1798; was curate and vicar of several parishes in and near London 1804–15; received degree of D.D. from the university of Oxford; was made bishop of Killaloe and Kilfenora, Ireland, in 1820, and in 1823 transferred to the see of Down and Connor. He was the author of a valuable *Commentary on the Bible* in connection with Dr. D'Oyley. This had an immense sale in England, and was republished in New York, with additions by bishop Hobart. Besides many sermons and tracts, and several poetical pieces, he published *Biographical Notices of the Apostles; Scriptural Narratives of Christ's Life; History of the Church of Ireland from the Reformation to the Union of the Churches of England and Ireland in* 1801; *Ancient Hymns from the Roman Breviary with original Hymns.*

MANTCHU'RIA, a territory in eastern Asia, under the dominion of the Chinese empire, extending between lat. 42° and 53° n., and bounded, according to its present limits, by the Amur on the n.; by the Usuri and the Sungacha on the e., separating it

from the Russian maritime territory of Orochi; by the Shan-Alin range on the s., separating it from Korea; and by a portion of the Khingan mountains, the river Sira-Muren, and the district of the upper Sungari, which separate it on the w. from the desert of Gobi. Previously to the incursions of the Russians on the n. the area of this territory was about 682,000 sq.m.; it is now about 378,000 sq.m.; nearly one-half having passed into the possession of the Russians, who concluded a treaty with the Chinese, Nov. 14, 1860, finally making over to themselves all the territory e. of the Usuri and n. and e. of the Amur. Pop. variously estimated at from 3,000,000 to 4,000,000. Mantchuria is divided into three provinces, Shing-King—formerly Leaotong, which alone contains upwards of 2,100,000 inhabitants, and the chief town of which, Mukden, is the seat of government for the three provinces—Girin or Kirin, and Tsi-tsi-har. The country is mountainous, densely wooded in the s,, but consisting chiefly of prairies and grass-land in the north. It is well watered and fruitful in the valleys. The rivers are the Amur (the northern boundary), the Usuri (the eastern boundary), and the Sungari, which waters the two provinces of Girin and Tsi-tsi-har. The Sungari is about 1200 m. in length; its banks, which form the most densely-peopled region of Mantchuria, are low and fertile, and its general course is n.e. to its junction with the Amur. About 200 m. from its source, it passes the flourishing trading city of Girin, in lat. 43° 40′ n., with a pop. variously estimated at from 150,000 to 160,000, and inhabited by Mantchus and Chinese, but by the latter in far greater numbers. The city of Mukden, on the Sira-Muren, is large and beautiful, surrounded by walls, and containing 200,000 inhabitants. In 1631 it was the seat of the government of the empire of Mantchu. Millet, barley, tobacco, and oats are largely produced, and herds of cattle are fed on the prairies. Chinese form the great bulk of the population; the Mantchus are for the most part soldiers, and are drafted out of the country into China. For the history of Mantchuria, see CHINESE EMPIRE.

The Mantchus are the present rulers of China, who gradually subjugated the country; the first emperor of the new dynasty, Shunche, succeeding to the last of the Mings in 1644. They are not a nomadic race like the Mongols, but are given to agriculture or hunting, according to the part of their country they inhabit. They are of a lighter complexion and slightly heavier build than the Chinese, have the same conformation of the eyelids, but rather more beard, and their countenances present greater intellectual capacity. Literary pursuits are more esteemed by them than by Mongolians, and they are less under the priesthood. The Mantchus, in short, may be regarded as the most improvable race in Central Asia, if not on the continent.—Williams, *Middle Kingdom*.

MANTEGN'A, ANDREA, 1431-1517; studied art under Francesco Squarcione, a famous master of Padua. Here Mantegna produced his first work in the churches of *Santa Sofia* and *San Christofano*. Rapidly acquiring skill and fame, he removed to Mantua, where his acknowledged masterpiece, "The Triumph of Cæsar," was painted. This is now at Hampton court, England. From Mantua he was called to Rome by Innocent VIII., and received from him the kindest treatment and remunerative employment, but soon returned to Mantua. Here, by his proficiency and genius both in the higher class of engraving and as a religious and historical painter, he obtained a high rank in his profession as well as large estate.

MANTELL, GIDEON ALGERNON, an eminent British palæontologist and geologist, was b. at Lewes, in Sussex, in 1790; studied medicine, and for some time practiced in his native town. Subsequently he removed to Brighton, and thence to London, where he died, Nov. 10, 1852. Mantell's principal works are: *Fossils of the South Downs* (1822); *The Fossils of Tilgate Forest; Wonders of Geology* (1838), perhaps the most popular geological work ever written by an Englishman; and *Medals of Creation, or First Lessons in Geology* (1844). He was a very voluminous writer, no less than 67 works and memoirs of his being mentioned in Agassiz and Strickland's *Bibliotheca Zoologiæ et Geologiæ*. His claims to a permanent place in the history of science rest chiefly on his laborious investigations into the fossils of the Wealden beds. To him we owe the discovery and description of four out of five of the great dinosaurian reptiles—viz., the *iguanodon*, the *hylæosaurus*, the *pelorosaurus*, and the *regnosaurus*.

MANTEL-PIECE, the lintel over the opening of a fire-place supporting the masonry above. It was in ancient times frequently ornamented with moldings and carving. The name is now applied to the marble or wooden jambs, lintel, and shelf so universally used.

MANTES (anc. *Medunta*), a t. of France, in the department of Seine-et-Oise, beautifully situated on the left bank of the Seine, 29 m. w.n.w. from Paris, on the railway between Paris and Rouen. Mantes is a place of great antiquity, and of much historic interest. It was a town of the Celts, from which the Druids were expelled by Julius Cæsar. William the conqueror took it by assault in 1087, put the inhabitants to the sword, razed the fortifications, and burned three-foruths of the houses; but here he received the injury, through the starting of his horse, which caused his death in a few days. Mantes has has a considerable trade in wheat, large tanneries, and saltpeter manufactories. Pop. '76, 5,649. On the opposite side of the river, connected with Mantes by bridges and an island, is the village of Limay, with a pop. of 1304.

MANTEUFFEL, EDWIN HANS KARL, Baron von, b. Magdeburg, 1809; entered a military career by joining the dragoon guards, April 29, 1827; and became second lieut. the following year. He displayed an industrious character allied with considerable capacity, and interested his superior officers to that degree that he was sent for two years (1834–36) to the general military academy. In two years following he acted as regimental adjutant, being named adjutant to the 2d brigade of cavalry guards, Oct. 18, 1839. From 1840–48 he was in the immediate service of prince Albrecht, but in the latter year was transferred to that of the king, with the rank of adjutant of the wing, being made a major in 1852, and lieut.col. in 1853. He was now placed in command of the 5th uhlan regiment; and in 1854 of the 3d cavalry brigade. His advancement continued to be rapid, and in 1858 he was made maj.gen., in 1851 adjutant-gen., and in the autumn of the latter year lieut.gen. In 1864 gen. Manteuffel was engaged in the Sleswick-Holstein war, was present at the battle of Missunde, and commanded in the engagements and movements which resulted in the occupation of Jutland. After the close of this war he was employed in effecting a solution of the difficulty between Austria and Prussia, and arranged for the convention of Gastein, by which this was brought about. He was now made governor of the duchy of Sleswick, with command of the Prussian troops in Holstein and the marines stationed at Kiel. In 1866 the war between Prussia and Austria broke out, and Manteuffel was ordered into active service. At midsummer he was commanding in chief the army of the Maine, and fought at Hemstadt, Vettingen, Rossbrunn, and Würzburg; receiving from the king for his services the order of merit. At the close of the war he was sent to St. Petersburg on a diplomatic mission, and on his return was made general-in-command of the troops in Sleswick-Holstein, being advanced to the rank of general of cavalry, and a month later made commandant of the 9th army corps. In 1868 he was placed in command of the 1st army corps, and was engaged in the Franco-German war. His corps was under fire at Courcelles and Noisseville, directed the evacuation of Metz and the disposal of the prisoners, and then re-entered active service in a campaign against gen. Bourbaki. Later he operated against the south and south-east armies of the French, and performed most brilliant and effective service. In 1872 gen. Manteuffel was invested with the insignia of the order of the Black Eagle, and was afterward made field-marshal gen., and aid-de-camp gen. to the emperor.

MANTEUFFEL, OTTO THEODOR, Baron von, b. Prussia, 1805; studied jurisprudence at Halle, and in 1827 became a minor magistrate at Berlin. When count Brandenburg undertook the suppression of the revolutionary movement of 1848, Manteuffel was made minister of the interior. In this office he displayed a high order of executive ability, and gained the confidence of the middle classes. In 1850 he took office as minister of foreign affairs. Two years later he was appointed president of the council of ministers, and in 1856 he was sent to Paris as one of the plenipotentiaries to negotiate a peace. He retired from the ministry in 1858.

MAN'TIDÆ. See MANTIS.

MAN'TIGER, or MANTÈGRE, a monster with the body of a tiger, the head of an old man, and long spiral horns. It is one of the imaginary creatures known in heraldic blazon, and is variously represented, sometimes with the horns of an ox and feet of a dragon. The supporters of the earl of Huntingdon are mantègres without horns.

MANTINE'A, anciently a city of Arcadia, in the Peloponnesus, on the borders of Argolis. It was situated on the river Ophis, in the midst of a broad plain, and was famous as being the scene of several battles, of which the most important was that fought between the Spartans and the Thebans under Epaminondas (362 B.C.), in which the former were defeated. Its site is now called *Palæopoli.* Some ruins still remain, the principal of which are those of a theater whose diameter was 240 feet. See col. Leake's *Travels in the Morea* (Lond. 1830).

MANTIS, a Linnæan genus of orthopterous insects, which included not only those now constituting the family *mantidæ,* but also the *phasmidæ* (leaf-insects, specter-insects, walking-stick insects, etc.). All of them are of very remarkable forms. The mantidæ have a narrow, compressed, and elongated abdomen, and a long thorax, which consists almost entirely of the first segment. The head is triangular, with large eyes, three small stemmatic eyes, and rather long bristle-like antennæ. The wings fold in a fan-like manner, and the wing-covers are long, narrow, and thin. The second and third pair of legs are long and slender, and are used only for locomotion; the first pair are chiefly used as weapons of combat and instruments of prehension, and have the *coxa* unusually long and large; the *femur* also long and large, compressed, and capable of closing on the *coxa,* so that the sharp edges cut like a pair of scissors. The mantidæ feed on other insects, and remain long fixed in one position, moving their fore-legs in the air to catch prey, which has led to a superstitious regard for them as *praying insects,* and to many foolish notions and legends concerning them. One species (*M. religiosa*) is plentiful in the south of France and in Italy, and others are frequent in warmer parts of the world. The mantidæ not only lie in wait for prey, but move about in quest of it, moving slowly, and advancing stealthily on the victim. Many of them are large insects. Some of the South American ones are 4 in. in length. They are all of very pugnacious disposition, the combat generally terminating in the decapitation of one of the combatants, or the divid-

ing of its body in some part by the legs of the other; and the victor enjoys his triumph in eating the vanquished. In China and some other parts of the east, these insects are kept in cages, and set to fight with each other for the amusement of the beholders. Some of the mantidæ (genus *empusa*) have the forehead produced into a horn.

MANTLE, a long flowing robe, worn in the middle ages over the armor, and fastened by a fibula in front, or at the right shoulder. The mantle is an important part of the official insignia of the various orders of knighthood. Ladies of rank wore similar mantles, in many instances decorated with heraldic charges, in which case the mantle bore either the impaled arms of the lady and her husband, or her husband's arms only. A number of examples may be seen in monumental effigies.

MANTLET, a sort of temporary fortification intended to protect the men working guns in embrasures, casemate, or port-holes from the bullets of sharp-shooters. The mantlet is usually made to be hoisted up while the gunner takes aim, and then lowered to cover the whole opening except a circular aperture for the muzzle of the cannon. With every increase in the range and precision of small-arms, mantlets become more essential for the safety of gunners. Mantlets are made of thick fir, of solid oak planks, or of iron plates, the last being preferable, as the lightest. At Sebastopol, the Russians effectively blocked their embrasures by thick mantlets of plaited rope suspended freely. A mantlet of planks or iron plates, about 5 ft. high, and occasionally mounted on small wheels, is also used to protect sappers working at the end of a sap, although a rolling gabion is preferred for this purpose by many engineers.

MANTLING, or LAMBREQUIN, a heraldic ornament depicted as hanging down from the helmet, and behind the escutcheon. It is considered to represent either the cointise, an ornamental scarf which passed round the body, and over the shoulder; or the military mantle, or robe of estate. When intended for the cointise, it is cut into irregular strips and curls of the most capricious forms, whose contortions are supposed to indicate that it has been torn into that ragged condition in the field of battle. When the mantling is treated as a robe of estate, the bearings of the shield are sometimes embroidered on it. A mantling adjusted so as to form a background for the shield and its accessories, constitutes an *achievement of arms*. It is not till the latter end of the 14th c. that the mantling appears as a heraldic ornament on seals. In British heraldry, the mantling of the sovereign is of gold lined with ermine; that of peers, of crimson velvet lined with ermine. Knights and gentlemen have generally crimson velvet lined with white satin; but sometimes the livery colors (see LIVERY) are adopted instead, as is generally the practice in continental heraldry.

MANTUA (Ital. *Mantova*), an ancient city of Lombardy, and formerly capital of a duchy of same name, but now belonging to the kingdom of Italy, is situated in lat. 45° 9′ 34″ n., long. 10° 48′ 1″ e. Its pop. (1871) of 26,687 comprises a number of Jews, whose commercial influence and social privileges are more extensive in this city than in any other of Italy. Mantua occupies two islands formed by branches of the Mincio, the waters of which surround the city, with the additional defense of swamps or marshy lakes. It is the most strongly fortified town in Italy, but, owing to its situation, is extremely unhealthy—a fact evinced by the pallid faces of the inhabitants. There are five gateways leading into the city, one of which, *La Porta dei Mulini*, deserves examination. The fortifications of Mantua, including its vast citadel, present such a combination of defensive resources, that its regular investment could only be effected by a numerous army; and its reduction even then would be impracticable, except by famine. It forms one of the four fortresses of the Quadrilateral, which, by the treaty of Villafranca, remained in the hands of Austria. The streets of Mantua are spacious and regular, but indifferently paved; the squares are numerous and fine. Some of the public buildings are splendid, both from the massive grandeur of their proportions and the novel beauty of their architecture. The inadequate population of Mantua, added to the somber character of its feudal structures, imparts to the city an air of gloomy decadence, except in the central commercial quarters, and the populous animated *Ghetto* or Jewish quarter, still subject to inclosure. The ancient ducal palace, or Castello di Corte, a vast irregular pile of building, was the state residence and fortress of the Gonzagas, by whom it was erected, and now serves as a state prison and for public offices. The adjoining sumptuous edifice, which now comprises the *Palazzo Imperiale*, the *Palazzo Vecchio*, and the *Corte Imperiale*, or Provincial Tribunal, was originally planned and begun by Buonacolsi, the feudal lord of Mantua, in 1302; it contains 500 rooms, including a magnificent suite of state apartments, whose choicest embellishment consists of the paintings and designs of the great Mantuan artist, Giulio Romano. The cathedral of San Pietro, also designed by G. Romano, contains some fine frescos. The churches of San Martino and Sant' Egidio are of great antiquity—the former dating from 528, and the latter from 568. The province of Mantua had a high reputation in the time of the Romans. After sharing the fate of the rest of northern Italy, it was seized by the Gonzagas about the commencement of the 14th century. The last duke of the house of Gonzaga died childless at Padua in 1708, when Mantua fell into the hands of Austria. Austria gave it up with her other Italian possessions in 1866.—Mantua is capital of a province of the same name, with an area of 855 sq.m.; pop. '72, 288,942.

MANU (from the Sanskrit *man*, to think; literally, the thinking being) is the reputed author of the most renowned law-book of the ancient Hindus; and likewise of an ancient Kalpa work on Vedic rites. It is matter, however, of considerable doubt whether both works belong to the same individual, and whether the name Manu, especially in the case of the author of the law-book, was intended to designate an historical personage; for, in several passages of the Vedas (q.v.), as well as the Mahâbhârata (q.v.), Manu is mentioned as the progenitor of the human race; and in the first chapter of the law-book ascribed to him, he declares himself to have been produced by Virâj, an offspring of the Supreme Being, and to have created all this universe. Hindu mythology knows, moreover, a succession of Manus, each of whom created, in his own period, the world anew after it had perished at the end of a mundane age. The word Manu—kindred with our "*man*"—belongs therefore, properly speaking, to ancient Hindu mythology, and it was connected with the renowned law-book in order to impart to the latter the sanctity on which its authority rests. This work is not merely a law-book in the European sense of the word: it is likewise a system of cosmogony; it propounds metaphysical doctrines, teaches the art of government, and, amongst other things, treats of the state of the soul after death. The chief topics of its twelve books are the following: 1. Creation; 2. Education and the duties of a pupil, or the first order; 3. Marriage and the duties of a householder, or the second order; 4. Means of subsistence, and private morals; 5. Diet, purification, and the duties of women; 6. The duties of an anchorite and an ascetic, or the duties of the third and fourth orders; 7. Government, and the duties of a king and the military caste; 8. Judicature and law, private and criminal; 9. Continuation of the former, and the duties of the commercial and servile castes; 10. Mixed castes and the duties of the castes in time of distress; 11. Penance and expiation; 12. Transmigration and final beatitude. The text of this work has been published in several editions both in India and Europe. An excellent English translation of it we owe to sir W. Jones (2d ed., by Haughton, London, 1825), and a very good French translation to A. Loiseleur Deslongchamps (Paris, 1833).

MANUAL, in military language, is an exercise with the musket or rifle, through which recruits are drilled, to give them a free use of their limbs, and of the weapon regarded merely as a pike. It comprises the first course of instruction after the rifle has been placed in the learner's hands.

MANUEL I, COMNENUS, Emperor of Constantinople, and fourth son of the emperor Calo-Joannes, was born about 1120, and succeeded his father in 1143. He became at once involved in an uninterrupted series of wars both with the eastern and western nations, and greatly distinguished himself by his courage and heroism. In 1144 Raymund, prince of Antioch, who had thrown off the Byzantine yoke, was compelled to submit again to vassalage; and in the following year the Turks, who had invaded Isauria, were paralyzed by repeated and decisive defeats. In 1147 the crusaders, under Louis VII. of France and Conrad III. of Germany, marched through Manuel's dominions without hindrance on his part, as he was at this time preparing for his notable contest with Roger, king of Sicily, for the possession of Greece. At first this contest was highly favorable to Manuel; but after the death of Roger the fortune of war changed, and peace was concluded in 1155. The rest of his life was spent in wars with the Hungarians and Turks. He died Sept. 24, 1180.

MANUEL II., PALÆOLOGUS, Byzantine emperor, 1348–1425, succeeded his father, John VI. He had been an associate in the empire in 1372. At the death of his father in 1391, being held as a hostage by sultan Bajazet, he escaped from Nicæa to Constantinople, his own capital, to secure the throne for himself, without informing the sultan. Bajazet, enraged at his breach of faith, marched against him, ravaged the country adjoining Constantinople, and invested the city by sea and land. Manuel applied to the western princes, who sent him an army of 100,000 men under Sigismund, king of Hungary, and John, count of Nevers. The allies, at first successful, were defeated with great slaughter by Bajazet at Nicopolis in 1396, with the loss of 10,000 men. Bajazet then returned to the siege with greater vigor than before. Seeing the determination of the citizens to hold out, he made a private agreement with John, Manuel's nephew, to place him on the throne of Constantinople, and John was to deliver up the city to the Turks, and remove the imperial seat to Peloponnesus. He sent also deputies to the inhabitants, proposing to withdraw his army provided they expelled Manuel and placed John upon the throne. Manuel voluntarily resigned, received John into the city, conducted him to the palace, and then set sail for Venice to ask aid from the western princes against the Turks. Large supplies were promised. The citizens of Constantinople refusing to comply with such a base treaty, the siege was renewed, and its fall imminent when Bajazet was called away to resist Tamerlane. He raised the siege and went against Tamerlane with a large army, but was defeated at Angora, 1401, and taken prisoner. After the defeat and death of Bajazet in 1403, Manuel reigned in peace. He was succeeded by his son John VII., Palæologus.

MANUFACTURES (from Latin *manus*, a hand, and *facio*, I make). Bearing the significance which it gained with its derivation, this word describes the first structures, processes, and compositions designed by the mind of man, and executed by his hand labor, with more accuracy than it does the accomplishment of the machinery of the

present day, to which it is more generally applied. The first articles of manufacture must have been such as could be successfully employed for procuring the necessaries of life; and, in fact, the first of such articles that have been discovered, representing the earliest ages of man's existence upon earth of which any traces remain, have been rude mills for grinding grain; knives and other offensive weapons for destroying game; fish-hooks; pointed implements, which evidently filled the place of needles; and stone hammers, axes, chisels, and other tools, used for building purposes (see LAKE DWELLINGS; LABOR). The processes to enforce nature and render its powers applicable to the preservation of human life were therefore, and in this order, the acquisition of food; the clothing of the body to protect it from the elements; and the erection of dwellings, partly for the same purpose, and partly for safety against wild and dangerous animals, and human foes hardly less dangerous in their savage condition. And it is to be observed that the ingenuity and toil of man have ever since been devoted to these purposes; added to which have been the necessities arising from improved or extended mental conditions, and the spread of wants in a direction other than material. Manufactures have therefore included food-processes, the manipulation of fabrics, and building-construction; to which have been added, in the course of time, the art of war, the arts of design, and applied science, as agencies to fulfill the duties imposed by an ever-changing and ever-advancing civilization. It is one of the fortunate incidents of human history that with few exceptions the processes of labor applied to the manufactures may be traced even in our day as these existed at the very beginning. It is possible to follow any art to its inception, and to trace its history to the first rude efforts of primeval man, with a considerable degree of accuracy, affording, when the results of such an investigation are brought into juxtaposition, a comprehensive view of the entire field of human art. Such investigations have been made, and their collected results exist in the industrial museums of Europe and America. Remarkable also is the occurrence of the earliest methods in use in the arts, in actual practice among savage and semi-civilized races in different parts of the world in our own time. The natives of Central and South America, Africa, and certain parts of Asia still employ the same processes in agriculture that were in use thousands of years ago; mills of the same character as those used by the Egyptians many centuries before the Christian era are still in active employment in northern Africa; and pottery of the same design and fashioned after the same methods and with the same tools as among the earliest races, are still made by their descendants in different parts of the world. And while we may thus view at one glance, in operation, methods and tools divided in actual history by many centuries, we are also enabled to follow the progress of the arts and manufactures, their improvement or their decadence, through existing specimens of workmanship. From the beginning in the aggregate—whatever may have been the case with certain nations or races—man seems to have been impressed by a restless spirit, and to have been continually provoked to an active ingenuity in labor. The very first instances of handiwork that have come to our knowledge through the labors of explorers have illustrated the impulse towards improvement. From the stone age to the neolithic, and from that to the age of iron—as we generally record our evidences of these periods—the progress not only in excellence of workmanship, but in beauty, is remarkable. And while it is easy to understand the mental processes that induced endeavor after a higher quality of article when the improvement represented a practical good to be achieved, it is necessary for us to reconcile our ideas of prehistoric man with the fact that he was influenced by a leaning towards the æsthetic, and that even so early he showed signs of struggling toward an improved art-taste. The fact is important that in all the history of manufactures the beautiful has been allied with the practical, with a persistence which seems to have the character of a law.—The next important tendency to be observed in viewing the history of manufactures is that of applying the forces of nature to the reduction of human labor. As it is to this tendency that we owe the inventions which so extended the scope of the arts, its importance will hardly be underrated. Yet it is to be observed that in the beginning the forces of nature, expressed and operative through such rude mechanical devices as were at first invented, were called into operation only when the power of man had proved unequal to the task in hand. Man labored to the extent of his capacity, and only then supplemented his own efforts by the employment of the mechanical powers. There is nothing therefore inexplicable in the fact that while we know the ancients possessed a knowledge of the more hidden forces, and the means to apply them, they did not make use of these in instances where they might, but seem to have preferred the exercise of human force and ingenuity. A noble ambition appears to have influenced man in those early days; impelling him to push to the utmost his individual capacity; and to place upon record, by means of his work, the comprehensive nature of man's ability, his power to meet emergencies, his control, within himself, of a microcosm representing all the possible constructive capacity of the entire world of mechanism. The arts of Greece and Rome, of Babylon and Nineveh, Carthage and Phenicia, as these have been preserved to us, sufficiently illustrate this phase of our subject. But the concentration cut of which grew marvelous excellence presently ceased to exist; the fall of Nineveh, Carthage, Greece, and Rome, the inroads of barbarians, and the distribution of power over the face of Europe, blotted out for the time all progress in the arts; and the "dark ages" settled down upon civilization through a gloomy period of centuries, to the utter

check of improvement, and to the destruction of the arts and manufactures, except so far as these contributed to positive necessities and to sensual desires. Out of this period of inaction and stagnation of creative ability, civilization burst forth in the 13th c., beginning the "middle ages" and the *renaissance*, a time when man reached the highest pitch of skill in hand-work, and when manufactures attained an excellence in beauty, capacity for service, and durability, which they have never since surpassed even if they have approached. The history of the arts and crafts of Europe in the middle ages shows a surprising advance in all directions. The progress in merit in the fine arts has been fully recognized, and this was reflected in the condition of the crafts and the improvement in manufactures. Directly we see it in the wood-carvings of Brabant, Flanders, and Italy; in the wonderful art displayed in the manufacture of fictile ware; in the form given to bronze, iron, and brass; and in the intricate and beautiful carving of ivory. The most magnificent armor, displaying workmanship of exquisite beauty, is of this period. And so the most commonplace objects—the ordinary utensils of the household, the very architecture of the houses themselves—reflected the splendid genius of the masters of art. And above all, we are bound to consider the honesty of the workmanship peculiar to those days. The linen and wool fabrics of Holland and Flanders have never since been improved upon. The heavy and costly damasks and satins and silks and velvets, which played so large a part in the costumes of the period, were honest stuffs, whose lasting as well as artistic qualities cannot be gainsaid. The furniture of the period was solid and firmly put together, besides being ornamented and decorated with correct taste and refined sentiment. In the reign of king John in England, the wealthier classes used iron chandeliers and candelabra, and each of these was finished and shaped by hand with the hammer and with the truest art-taste. The story of the Della Robbias, and their labors in search of a special glaze for china, is equaled only by the later story of Bernard Palissy, whose struggles after the same secret, lost again, have furnished the material for many a book. In those days the blacksmith, and the cordwainer or shoemaker, was as proud of his skill, and as earnest in the fulfillment of what he deemed his obligation to his craft, as was the most esteemed artist of Florence or Venice under the patronage of the Medici. Faust, who became a printer, was a goldsmith in Mentz; Hans Sachs was a cobbler; Benvenuto Cellini was a gold and silver smith; Andrea del Sarto, the painter, was a goldsmith's apprentice; and Ghiberti, who executed the two gates of the baptistery in Florence, which Michael Angelo said were "worthy of Paradise," was the son of a goldsmith. Thus, at that time, art and manufacture went hand in hand; the union of the beautiful and the useful being considered not only desirable, but incumbent on the artificer as a part of his trade.

The conditions of labor in Europe, and therefore those of the manufactures, changed materially during the period between the 16th and the 18th centuries. The combinations of workingmen into guilds, and the wealth and power to which these attained, brought about the introduction of the force of *capital*, by the concentration of great wealth in a few hands; and the application of this force to manufactures on an enormous scale was brought about by the application of power to machinery, and the establishment of the factory system. From this moment, not only the system of manufacturing, but the character of the workmanship, and of artisans, the nature and amount of the demand for manufactures, the methods of supply, and the modes of transportation, altered throughout the civilized world. The history of manufactures fell under the influence of the invention and application of machinery, to which the arts of design necessarily played a secondary part. From 1771, when the first mill with water-power, and Arkwright's machinery, was set up in England, to 1835, the number of operatives employed in the factories of the United Kingdom had grown to 354,684, of which number 195,508 were females. In 1856 the number of operatives was 682,497, of whom 409,300 were females, 25,982 being under 13 years of age. The number of factories, between 1838 and 1856, increased 28 per cent; the amount of power increased 63 per cent; and the number of hands employed, 80 per cent. In 1786, in every $200,000,000 in value of the product of manufacture in France, 60 per cent of the cost was for labor, and 40 per cent for raw material. In 1876 this condition was exactly reversed, 40 per cent only of the cost being for labor, and 60 per cent for raw material. In 1876 the total industrial product of France was valued at $2,400,000,000. These few figures are offered merely for their suggestive value; the statistics of the different articles of manufacture, and in different countries, will be found under their proper titles; see COTTON, LINEN, HATS, etc.

Beverley, in his *History of Virginia*, writing in 1705, refers thus to the dependence of the American colonists upon other nations to supply their wants: "They have their clothing of all sorts from England, as linen, woolen, and silk, hats and leather; yet flax and hemp grow nowhere in the world better than here. Their sheep yield good increase and bear good fleeces, but they shear them only to cool them. The mulberry-tree, whose leaf is the proper food of the silk-worm, grows there like a weed, and silk-worms have been observed to thrive extremely, and without hazard. The very furs that their hats are made of, perhaps, go first from thence. The most of their hides lie and rot, or are made use of only for covering dry goods in a leaky house. Indeed, some few hides, with much ado, are tanned and made into servants' shoes; but at so careless a rate that the farmers do not care to buy them if they can get others; and sometimes, perhaps, a

better manager than ordinary will vouchsafe to make a pair of breeches of deerskin. They are such abominable ill-husbands, that though their country be overrun with wood, they have all their wooden-ware from England; their cabinets, chairs, tables, stools, chests, boxes, cart-wheels, and all other things—even so much as their bowls and birchen brooms—to the eternal reproach of their laziness." From which emphatic narrative by an eye-witness it will be inferred that the standard of manufactures in the country under consideration, a century and three-quarters ago, did not offer promise of the results reached at the present time. The first attempt at ship-building in the colonies was in the construction of the *Onrest* in 1614 at Manhattan river. She was 16 tons burden, 38 ft. keel, 44½ ft. long, and 11½ ft. wide. In her, in 1616, capt. Wilkinson discovered the Schuylkill river, and explored nearly the entire coast from Nova Scotia to the capes of Virginia. The saw-mill is said to have been introduced into Massachusetts in 1633, some years before it was used in England. And as late as 1767 a saw-mill was destroyed in the latter country by a mob, because it was supposed to be destructive to the work of the sawyers. In 1641 the general court of Massachusetts passed an act to the effect that there "should be no monopolies but of such new inventions as were profitable to the country, and that for a short time only." Saw-mills were introduced by the Dutch in New York as early as 1633, and seem to have been used there also for grinding-mills. The erection of these mills brought about an improvement in house-building, which had previously amounted only to the construction of huts or wigwams. The first brick-kiln in New England was set up in Salem, Mass., in 1629. In New York bricks were imported from Holland, until governor Stuyvesant introduced the industry. There were certainly tanners, cart-makers, glovers, furriers, and shoemakers in the colonies about the middle of the 17th c., despite the assertion of Beverley, whose observation, however, was probably confined to Virginia.

In the manufacture of fabrics the early colonists used the distaff and spindle, soon superseded by the spinning-wheel. The British in those days, seeking to force the colonists to buy everything in the home market, threw every possible obstacle in the way of domestic manufactures. Early in the 18th c. spinning-schools were started in Boston, and special taxes were imposed for their support. During the revolutionary war the colonists depended on their own exertions for clothing and other necessities, and Hargreave's and Arkwright's inventions were not permitted to be introduced across the Atlantic, so jealous were the British of the trade in their manufactures. Despite all their efforts, however, a cotton-factory was established at Beverly, Mass., in 1787; of Arkwright's machines, the first used in the United States was in a mill at Pawtucket, R. I., in 1790. The first cotton-mill ever built in the world, which combined all the requisites for making finished cloth from raw cotton, is said to have been erected in Waltham, Mass., in 1813. Our colonial ancestors usually obtained their furniture from England, the most of it, of the best class, being made of mahogany and oak. At first the articles made in the colonies were of the rudest character, and constructed of native woods. Later on, a South American and West India island trade sprang up, and mahogany and rose-wood were imported, and worked up into bedsteads, sideboards, and cupboards. The first nails made in the colonies were manufactured by hand, and it was customary among the country people to erect forges in the chimney-corners, and in the long winter evenings to make quantities of nails—even the children taking a share in the labor of this industry. About 1790 a machine for cutting and heading nails was invented by Jacob Perkins of Newburyport, Mass., which is said to have had a capacity of 10,000 nails per day. Another machine, invented by a citizen of Bridgewater, Mass., made, in 1815, 150,000,000 tacks. The introduction of the manufacture of glass into the American colonies was contemporaneous with the settlement of the country; the first glass manufactory being set up in the woods about a mile from Jamestown, Va., in 1607. In 1621 a fund was subscribed to establish a factory of glass beads, to be used as currency in trading with the Indians for furs. The first glass manufactory in Massachusetts was established at Germantown, near Braintree, for glass bottles alone. In 1639 a glass-house was set up in Salem. In 1752 the general court of Massachusetts passed an act granting the sole privilege of making glass in the province to Isaac C. Wesley. A glass-house existed in Philadelphia in 1683. Pottery was brought out from England and Holland by the first settlers, but the early colonists used wooden dishes and pewter platters. Some pottery was made by the Plymouth, Jamestown, and Manhattan colonists. In 1819 the manufacture of fine porcelain was commenced in New York, and in 1827 it was made in Pennsylvania. The manufacture of hats was considered of importance by the colonists, and in 1662 the colonial government of Virginia offered a premium of 10 lbs. of tobacco for every hat made in the province. Protection was early applied to the raw material of this industry, and in 1675 its exportation was prohibited. Before 1800 this manufacture was conducted in nearly every state in the union, and by the census of 1810 returns were made of the manufacture of hats to the amount of $4,323,744.

Silk-worm culture was proposed by James I. on the settlement of Virginia, and that monarch sent supplies of silk-worms' eggs to the colony from his private stores. In fact, more or less silk was raised in all the colonies. In 1788 the president of Yale college wore at commencement a silk gown made from materials raised and woven in Connecticut. A piece manufactured from silk raised near Charleston, S. C., in 1755, was made into three dresses, one of which was presented to the princess dowager of Wales, another

to lord Chesterfield, and a third to Mrs. Harvey of South Carolina, in the possession of whose family it still remains. In 1837 the manufacture of silk in the United States received a powerful impulse from a report of the congressional committee on manufactures in favor of this industry. It was stated that one specimen of the *morus multicaulis*, or mulberry, would sustain a sufficient number of silk-worms to raise 120 lbs. of silk, worth $640. Attention was directed to this industry in nearly all the states, and a condition of excitement occurred which became intensified by the promise of large fortunes. In the following year this excitement culminated in a degree perhaps never equaled by any similar movement, except the great "tuber" or bulb excitement in Holland and England. Single mulberry-trees sold at $10, nurseries were established and did a thriving business, and thousands of persons invested in the new speculation. Two years later a revulsion of interest occurred. Most of the nurseries were abandoned or destroyed, and *morus multicaulis* trees, healthy and well-branched, were offered at three cents each without finding buyers. See SILK.

The manufacture of ladies' shoes began early in colonial times, and the town of Lynn, Mass., has been distinguished for this branch of industry almost from the time of its settlement. The first shoemakers in Lynn were established in 1635, and the first shoes made by them were of woolen cloth or neat leather only. Until 1800 shoes were made with wooden heels, covered with leather, but after that time leather heels were substituted. The first invention of importance in this manufacture was the pegging machine; the next was the last-machine invented by Elias Howe. Another important invention was the McKay sewing machine, for stitching the uppers and soles together. In 1870 Lynn produced 187,530 cases of boots and shoes, of 60 pairs each, being 11,250,000 pairs, valued at $17,000,000. An important manufacture, and one which is now more than a century old in the United States, is that of combs. These were at first imported from England by the colonists, but in 1759 an iron comb manufactory was in existence at West Newbury, Mass., where the business is still extensively conducted. In the same year there was a comb manufactory in Pennsylvania, and in 1793 one in Boston, and two or three in Leominster, Mass. The first machine for making combs was patented by Isaac Tryon in 1798. In 1809 three manufactories were established in Connecticut. At first the teeth were cut singly by a fine steel saw; but in 1814 a patent was granted for a machine which cut all the teeth at one operation. The invention of vulcanized India-rubber effected a revolution in the comb manufacture. An important manufacture is that of the cards used in the manufacture of cotton and woolen cloths. During the colonial period these cards were manufactured by hand-labor; and in that form their making continued to be a valuable branch of industry until the latter part of the 18th century. In 1777 Oliver Evans invented a machine for making cards, which is said to have produced them at the rate of 300 a minute. In 1784 another machine was invented which cut and bent the teeth, and had a capacity of 86,000 an hour. Cannon and cannon-balls were cast in Massachusetts as early as 1664. In 1748 a foundry at Bridgewater, Mass., made from 3 to 42 pounder guns; and during the revolution, cannon, cannon-balls, and shells were made in Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, and Maryland. Up to 1857 about 300,000 cannon had been cast in the United States. The manufacture of wall-paper did not begin in the United States until 1765, and in 1789 a production of 16,000 pieces per month in Philadelphia was considered a fair quantity. The first patterns with glazed grounds were made in 1824, but soon after the best French designs began to be imitated. The manufacture of iron was naturally one of the earliest industries practiced in the colonies. In 1620 there were iron-works at Falling Creek, in the Jamestown, Va., settlement, but the following year the place was attacked by Indians, and the inhabitants massacred, which stopped the manufacture of iron in that locality, and it was not resumed there until 1712. The first iron manufactory in Massachusetts was set up in Lynn about 1663, the village about the works being named Hammersmith, after the place of the same name in England, whence many of the workmen employed there had emigrated. The first article of iron said to have been cast in the American colonies was made at these works, being a small iron pot capable of holding about a quart. In 1750 there were in existence in the colonies 3 iron-mills and one furnace. The description of a furnace erected in 1794 in the town of Carver, Mass., mentions that 10 forges were there employed in making bar iron from scraps to the amount of 200 tons annually. Another of the early colonial industries was the manufacture of cordage, and as early as 1631 it was made in Boston, and in Charlestown, Mass., in 1662; in 1698 there were several rope-walks in Philadelphia; and in 1794 Virginia and Maryland had each more rope-walks than any two of the northern and eastern states. In 1804 a spinning and twisting mill for making cordage was patented in the United States. The first paper-mill in America of which we have any account was erected at Roxborough, near Germantown, in Pennsylvania, about 1693. This was 50 years after printing had been introduced into the colonies, but only 5 or 6 years after a proclamation had been issued by the English government for the establishment of the first manufactory of white paper in England. The paper-mill in question was built by an ancestor of David Rittenhouse—whose family in Holland had long been engaged in the manufacture of paper—and William Bradford, the first printer in Philadelphia. In 1728 Bradford, when government printer in New York, owned a paper-mill in Elizabeth-

town, N. J., which was probably the second one erected in the colonies. Benjamin Franklin was, at various times, interested in the erection of 18 paper-mills. In 1787 there were 63 mills in operation in all the states. It is said that the first manufacture known to American history was that of salt, which was undertaken by the colonists at Jamestown, Va., in 1620. The first mill set up in New England was a wind-mill, near Watertown, Mass., which was taken down in 1633 and erected on Copp's hill in Boston. In New York the first mill was a horse-mill, which was built in 1626 on the site now occupied by Trinity church in that city. Agricultural implements were not made in America until a comparatively recent period. One of the first persons to make a plow was Thomas Jefferson, who attempted to solve the mathematical problem of the true surface of the mold-board, and in 1793 had several plows made after his patterns, which he used on his estates in Virginia. The first American, after Mr. Jefferson, who made plows for common use was a farmer living in New Jersey, by the name of Charles Newbold, who invented the first cast-iron plow made in America. The manufacture of beer was undertaken in the very earliest history of the colonies. One John Appleton set up the first malt-house in Massachusetts in 1640. In 1633 Wouter Van Twiller caused the erection of a brewery in New York city. The distillation of brandy commenced in the colonies in 1640. Wine was made in Virginia from the native grape by French colonists, who came over for the purpose, before 1622. In New England governor Winthrop planted a vineyard as early as 1630, and Governor's island, in Boston harbor, was granted for this purpose in 1634.

The first cloths ever made in the colonies were the result of a bounty offered by the general court of Massachusetts in 1640. In the following year this bounty was given to several persons who made attempts at this manufacture; probably, at first, a coarse description of linen. The first systematic effort at the manufacture of woolens was by a company of Yorkshire men in 1644 at Rowley, Mass. At this period cotton was obtained from Barbadoes, while hemp and flax were native. Cotton seeds were first planted in the colonies in 1621; the plant was introduced into the Carolinas in 1666. It was grown only as a garden-plant, however, until after the revolutionary war. The first exportation of raw cotton occurred in 1754. In 1775 a corporation was formed in Philadelphia called the "United company of Philadelphia for promoting manufactures," of which Dr. Rush was president. Its object was "to establish American manufactures of woolens, linens, and cottons, with a view to the exclusion and supersedure of British goods." The company possessed a spinning-jenny, newly imported from England, and employed in their factory 400 women. Two years later this company contracted with congress to supply clothing for the army.—A report made to the British house of commons in 1731, by the board of trade, on colonial industries, stated that in the American colonies the settlers had "fallen into the manufacture of woolen cloths and linen cloths, but for the use of their own families only; that the very high price of labor rendered it impracticable for them to manufacture such articles at less than 20 per cent dearer than that exported from England; that the greater part of the clothing worn in the province of Massachusetts Bay was imported from Great Britain, and sometimes from Ireland; that there were a few hat-makers only in the maritime towns; that there were no manufactures in New York worth mentioning, or in New Jersey; that the chief trade of Pennsylvania lay in the importation of provisions, no manufactures being established, and their clothing and utensils for their houses all imported from England; that in Massachusetts Bay some manufactures were carried on, as brown holland for women's wear, which lessens the importation of cloaks and some other sorts of East India goods." This report, in view of what has been heretofore stated, will be seen to exhibit a desire to underrate the manufacturing industry of the colonies; which was, however, already encroaching seriously upon the demand on the home market.

This brief statement concerning the early history of American manufactures is chiefly of interest in displaying, by contrast, the vast movement which took place in the century following the revolutionary war. In the United States, as elsewhere throughout the world, the organization of local, national, and international exhibitions has forwarded this movement with a rapidity and a result of excellence otherwise unattainable.

The gross statistics of manufacturing in the United States were given in the U. S. census for 1870 as follows:

Establishments	252,148	
Steam-engines—Horse-power	1,215,711	2,346,142
Water-wheels— "	1,130,431	
Hands employed—Males above 16	1,615,598	1,939,368
" " —Females above 15	323,770	
Capital	$2,118,208,769	
Wages	775,584,343	
Material	2,488,427,242	
Products	4,232,325,442	

The increase in the different elements of this manufacturing industry as between 1850–60 and 1860–70 was as follows.

	Percentage of increase 1850–60.	Percentage of increase 1860–70.
Establishments	14 per ct.	80 per ct.
Hands employed	37 "	33 "
Capital	Doubled.	Doubled.
Wages	60 per ct.	More than doubled
Material	More than doubled.	" "
Products	85 per ct.	2⅓ times greater.

The approaching publication of the U. S. census returns for 1880 will afford material in tabulated form by which it will become practicable to deduce important conclusions, and possibly to establish the existence of positive laws controlling the movement of the manufacturing industry as a whole, and in its relation to the most vital economic interests—not of the laboring classes alone, but of the race.

MANUMISSION, the form by which, in ancient Rome, slaves or other persons not *sui juris*, were set free. There were three ways in which the release might be accomplished, viz., by *vindicta*, census, or will. The oldest of these forms was the *vindicta*, which was as follows: The owner of a slave brought him before a magistrate and made a statement of the grounds upon which he proposed to make him free. Then the lictor laid a rod on the head of the slave and declared him free, the master pronouncing the words "I wish this man to be free," and at the same time turning him about and letting him go. Then the magistrate proclaimed his freedom. Freedom by census was effected by the slave giving in his name, by direction of his master, at the lustral census. By will a slave could be freed conditionally or unconditionally, or made free and an heir to the testator. The laws at different periods placed restrictions upon the right of the master to manumit his slaves, such as limiting the number he might set free, and preventing him from defrauding his creditors. The manumittor stood to the manumitted in the relation of a patron to a freedman, and if the former were a citizen the latter became a member of his *gens*, and assumed his family as well as personal name, to which he added such surname as pleased him, but commonly that by which he had been known as a slave.

MANURE. This is a term applied to a great variety of substances, mineral as well as organic, which have been used for the purpose of increasing the produce of those plants that man selects for cultivation. Lime, and the ashes of vegetables, have been applied to the land to increase its fertility from time immemorial; so also have all kinds of organic substances, whether vegetable or animal. The rationale of such applications to growing plants was but little understood till chemistry revealed to us the nature of the materials which entered into the composition of all plants. At the present day, much definite knowledge has been acquired of the true nature and action of the various substances that are found to increase the growth of our cultivated crops. It was long supposed that the food of such a varied class of plants as the globe presents must necessarily be very different, almost as much so as the difference in their forms and properties of their products. Chemistry, however, has shown that the food of all plants is very much alike, though some classes must be supplied with certain substances in greater abundance than others. The great mass of all vegetables is resolved into carbonic acid, water, and ammonia, on being subjected to heat or burned in a fire. It is these same substances which constitute the chief food of all plants. The light of the sun enables plants to decompose and assimilate carbonic acid and ammonia, and to manufacture out of them the various products they contain. All organic substances yield these by slow decomposition, as well as by combustion. It is for this reason that such substances increase the fertility of land when added to it. Water is so common an article, that nature provides all that plants require. Carbonic acid, too, is contained in considerable proportion in the atmosphere, and is readily taken from it by the leaves; still, it is of great use when applied to the soil as vegetable matter, and the decomposition rendered accessible to the roots of plants. Ammonia exists in exceedingly sparing quantities in the atmosphere, as well as in rain and river water, so that artificial applications to the soil are generally needed to produce full crops. The nitrogen which enters into the composition of plants is generally supposed to be capable of being only assimilated either in the form of ammonia or nitric acid; it is for this reason that the salts of ammonia and nitric acid are all very powerful fertilizers. They generally produce a dark-green color in the leaves, such as is associated with healthy growth and luxuriance.

But besides carbonic acid, water, and ammonia, plants feed upon certain mineral or earthy substances, which seem to impart the power of condensing and digesting the other organic elements. On plants being burned, they leave lime, potash, soda, magnesia, silica, sulphates, and phosphates, as ash. These substances are all found to exist in certain kinds of plants in proportions which are confined within rather narrow limits. The earthy substances, it must be remembered, enter into combinations in definite proportions with the other constituents, and are thus linked together in the vegetable organisms as part and parcel of their structure.

Lime acts as a manuring substance directly by supplying one of the constituents of plants; so also does magnesia. But lime is often added as an agent to assist in digest-

ing and preparing the organic materials existing in the soil. See LIME. Magnesia is seldom applied singly to the soil; it is usually associated with limestone, and is generally contained in the soil in quantities sufficient for the wants of plants.

Potash is a substance most essential for all our cultivated plants; its market-price, however, is so high, that farmers seldom apply it directly to the soil. They employ certain crops, such as clover and turnips, to gather it up for them in the soil. These are consumed on the farm by cattle and sheep, and as little potash enters into animal tissues as a permanent constituent, it is mostly returned to the dunghill in the excrementitious matters. Farm-yard dung thus possesses a value of its own, by supplying this constituent, which cannot be bought economically in the market. Soda can be easily obtained in the form of common salt, but as this substance is usually associated with potash, the one is found in the dung-heap as well as the other. Common salt is applied to corn-crops that are growing too rapidly. The salt has the effect of stiffening the straw, and rendering it less liable to lodge. Salt is also used with great success in growing mangold-wurzel, as this is a plant which was originally taken from the sea-shore.

Sulphates.—Every plant contains a quantity of sulphur, which is derived from the sulphates that are found in the soil. Sulphate of magnesia has often been applied with marked effect for turnips and potatoes, but its use does not commonly pay the expense of the application. A much cheaper source of sulphur is found in sulphate of lime or gypsum (q.v.).

Phosphates.—These are largely used in agriculture. Phosphoric acid being very sparingly diffused in most soils, many plants have apparently great difficulty in obtaining as much of this material as is necessary to rapid growth, and hence the importance of an artificial supply, which is administered in the form of phosphate of lime. The chief sources of this important element are bones (q.v.), apatite (q.v.), and guano (q.v.). The reason of its importance, and the principle which should guide its application, are explained in the article BONES AS MANURE.

Nitrogenous Manures.—Plants are supplied with nitrogen in the form of nitrates, or of salts of ammonia. Nitrates and the salts of ammonia promote growth in all cultivated plants when the earthy substances that enter into their composition are present. Nitrogenous manures are often beneficially applied without other substances to grain, because the grain-plants have greater facilities than the turnip for taking up phosphates and other constituents from the soil. So also, to a still greater extent, do we see the operation of this principle in the case of grass. Having a permanent staff of roots in the soil, the plants are ready to gather up the necessary supply of mineral food when abundant nitrogenous food is presented to them, and thus nitrogenous manures of all kinds have very marked effects on grass. What determines the amount that can be profitably applied to the different cultivated plants, is simply the capability that each species possesses of expanding under such treatment.

Farm-yard Manure.—This is the most valuable manure that the farmer uses. It contains all the elements of plants, and without its use in ordinary circumstances the fertility of the land would rapidly deteriorate. The richer the food upon which stock is fed so much the richer the manure produced. Stock fed upon straw and water leave a very inferior manure, that requires to be largely supplemented by other materials. Turnips add largely to the value of manure, and oil-cakes of all kinds, from containing nitrogen and the earthy matters of the seeds of oil-bearing plants, produce a rich manure. Farm-yard manure, under ordinary circumstances, is much more valuable for some kinds of crops than for others. The potato, for example, cannot be raised with much success unless it be supplied with this or other bulky manure having the greater number of ingredients present. This does not appear to arise from its absolutely requiring more of any one substance than many other plants that can do far better without artificial supply. It seems to be owing rather to a deficiency of power to gather its food when dispersed through the soil. A large allowance of farm-yard manure is therefore applied to the potato when it is grown in great quantities. The bean, also, is dependent on farm-yard manure more than the pea. Large breadths of turnips are often raised without farm-yard manure, as, when supplied with phosphate and nitrogen, they seem to have greater facilities for taking up what is diffused through the soil. The weaker and poorer the soil the more important does farm-yard manure become for all plants. Farm-yard manure also tends to render soils more adapted for carrying clovers, and many farmers always apply this to lands which are to be sown out in grasses.

Liquid Manure.—This is a favorite manure in many districts. Scotch and English farmers, in general, endeavor to have all the liquid excrements of the stock absorbed by the straw, and carried out in the solid form. On many farms, however, far more is produced than can be absorbed by the straw. Various modes have been adopted to apply it when this is the case. It is commonly done by a large barrel drawn by a horse; the liquid is distributed by various methods as the horse walks over the ground. The liquid manure is commonly applied to grasses, more especially to clovers or rye-grass, common or Italian. As the liquid accumulates it may be applied to the young grasses as soon as the corn crop is removed. The plants, being vigorous in autumn, absorb it, and form roots and juices that are available as soon as the growing season arrives. It may be applied during intervals of mild weather during the whole winter. It is, no doubt, most economical to apply it at the season of growth, as the roots take it up then very readily,

and there is comparatively little waste from being washed out of the soil. In some large establishments the whole urine is collected during the winter in large tanks, and applied in spring. This has been done on a large scale by means of underground pipes laid over the fields, the liquid being distributed by means of a pump and hose. Steam or water power has been in some cases applied to this operation; in others it is effected by gravitation, when the situation of steading and reservoir suits. In wet weather the liquid manure can be put on pretty strong, but in dry weather large quantities of water are added for the purpose of diluting it and not allowing it to injure the plants. Liquid manure is exceedingly rich in all the elements of plants, and is valuable for all crops; but there are often considerable practical difficulties connected with its use and distribution.

MANUSCRIPT, from the Latin *manu scriptum*, written by hand, the original writing of a book, tract, or pamphlet prepared for the press. The ancient manuscripts were inscribed on papyrus, or parchment, and were preserved in sheets or rolled. The Egyptians rolled their papyrus manuscripts with regard only to the length of the subject treated; brief monographs being preserved flat, while treatises of greater length were formed into rolls whose extent was only governed by the comprehensiveness of the subject and the fluency of the writer. Manuscripts on parchment or vellum were at first made in rolls, but about the 3d c. these began to take the form of flat pages, precisely as in our books, and usually quarto in size. Mexican manuscripts when not rolled were folded as we do a map, and had covers of wood for their protection.—The multiplication of manuscripts among the Greeks and Romans, in the absence of any art of mechanical reproduction, became of necessity a matter for system and regularity so far as this was possible. At first, the art of transcribing belonged almost wholly to such among the slaves as became adept in writing. As the system of slavery among those nations was one of minute subdivision into classes, to each of which was allotted a specific kind of duty, this became comparatively easy, certain slaves who displayed facility being specially educated to be copyists. Of course, the value of a slave was increased by his becoming efficient in the practice of this art, and this fact becoming obvious the art was adopted in Rome by persons who became professional transcribers, not being slaves. And as early as the 5th c. this had become a business in which, in some cases, a number of persons were associated together, and these were bound by agreement, and by rules and regulations, formally adopted. The Egyptian papyri were, as a rule, written in black and red, with occasional ornamentation by the use of other colors, and even of gold. Sometimes to these were added pictorial illustrations of remarkable taste and delicacy of execution. Fourth and 5th c. manuscripts have generally the body of the writing in black ink, the initial letters being in red, with some display of ornamentation in form: sometimes several of the beginning words, or even two or three lines, are in red ink. The Arabic, Persian, and Syriac manuscripts are often illuminated, frequently much gold is used, and arabesque designs are common among these: the Koran does not permit the drawing or other representation of the human figure, and this character of ornamentation does not therefore occur among oriental manuscripts. The fashion of introducing pictorial art into the making of manuscripts was one which began at a very early period. There is a manuscript extant in which figures of human beings are used for illustration, which dates back to the early part of the 4th century. Varro, who lived in Rome in the 1st c. B.C., was the friend of Cæsar, and was directed by him to form a public library, is said by Pliny to have written a work of biography which he illustrated with many hundred portraits. A copy of *Dioscorides* in the imperial library at Vienna is illustrated with pictures of plants; and a 4th c. *Virgil* in the library of the Vatican is filled with decorative miniatures. A manuscript, which has been partly destroyed by fire, exists in the British museum library, which is still more remarkable in the way of illustration. It contained originally portions of both the Old and New Testament, and was ornamented with 250 miniatures, each of them 4 in. square, some of which remain in the partly destroyed fragment, the date of which is supposed to be about the 6th century. A copy of Homer's *Iliad* in the Ambrosian library in Milan, very ancient, is adorned with miniatures. Among the colors employed in writing in those early times were purple, green, blue, and vermilion, with gold and silver. The university of Upsala in Sweden has a splendid specimen known as the *Argenteus Codex* (see ULFILAS), which is written in letters of silver with initials of gold on violet-colored vellum. It was not until after the 4th c. that the initial letters were made larger than those in the body of the text; after that they increased in size until they were several inches in height, and sometimes even occupied an entire page. The Irish manuscripts of the 7th to the 10th c. displayed the most extraordinary forms of initials, being grotesque in character; objects from natural history were united by complicated patterns of interlaced work, the whole effect being unlike anything else in manuscript anywhere, and apparently original with the Irish illuminators, to whose work we shall return further on. The early Frank manuscripts show the influence of oriental styles, the illuminated initials being adorned with arabesques, combined with foliage patterns. The earliest Greek and Latin manuscripts were written without points or divisions, in square capital letters. Uncial writing was in use at the same time, and superseded the other style in about the 6th c.; it differed from the latter in being a combination of capitals and small letters, and led up to the *cursive* or flowing writing, which became customary by the 10th century. Abbreviations

were employed very early in the history of manuscripts, and by the 12th c. had become so general that manuscripts of that period are exceedingly difficult to read. Among such abbreviations, and tending to complicate still more the task of reading, are the arbitrary signs invented by Tiro, Cicero's freedman, for his system of short-hand. Punctuation was not known until the 10th c., when the comma first came into use, to be followed by exclamation and interrogation points, and the parenthesis five centuries later: about the 12th c. we first meet with the Arabic numerals in manuscripts.—First among the ancient manuscripts still in existence are the rolls of papyrus found in the tombs of Egypt, and which are frequently exhumed in a perfectly preserved condition—after having been buried for thousands of years—owing to the dry climate and the entire want of humidity in the sandy soil. Among these are both Egyptian and Greek manuscripts, the former being in hieroglyphic, hieratic, or demotic characters, and nearly always of a religious nature, and having special reference to the dead. One of these papyri, existing in the national library in Paris, is supposed to be of a period nearly four thousand years before Christ: it is a moral treatise, written by an Egyptian prince. There are also found many business documents, bills of sale, accounts, and letters, which are written in the demotic character. Of the Greek manuscripts on papyrus one of the oldest known to be in existence is of the 3d c. B.C., a portion of one of the books of the *Iliad;* another, found at Herculaneum, is part of a musical work by a writer of the 1st c. B.C., and is of that period. A petition to one of the Ptolemies, of the 2d c. B.C., exists in Paris. In the British museum there are rolls of parchment more than 3,000 years old, though the date of the invention of this material has been ascribed to the 2d c. B.C. The oldest parchment manuscript of a date since the beginning of the Christian era, is supposed to be the palimpsest (q.v.) of Cicero's *De Republica*, attributed to the 2d c., and now in the Vatican library at Rome. There are also in that library a copy of *Terence* of the 4th or 5th c., and a *Sallust* of about the same period. The celebrated Medicean *Virgil*, nearly perfect, is in Florence, in the Laurentian library; it is also of the 4th or 5th century.—The oldest manuscript of the Bible known to be in existence is the *Codex Sinaïticus*, found by Tischendorf in a convent on Mt. Sinai, and placed in the imperial library of St. Petersburg; it is believed to be of the 4th century. The *Codex Vaticanus*, a Greek manuscript of the Bible, is of about the same period with the last, though this is not so well authenticated. The *Codex Alexandrinus*, in the British museum, is of the middle of the 5th c.; and the *Codex Bezæ*, in the library of the university of Cambridge, Eng., of the 6th century.—Returning to the subject of ornamentation in this connection, and reverting to the labors of the Irish illuminators, we may properly quote from an English authority in regard to the importance and value of this class of manuscripts: "To the remotest of these nations the praise is due of having invented and developed an independent school of ornamentation, and one destined to become a formidable rival to the traditionary splendors of eastern art. In Ireland, as far back as the 5th c., a style of art had been practiced, which in the succeeding centuries attained a perfection almost incredible. In nearly complete isolation from the rest of the civilized world, having few opportunities of seeing and admiring the works of the great Greek artists, their method of ornamentation exhibits no artistic power in the higher sense of the word, but is remarkable for a fine harmony of color, and a precision of technical execution little short of miraculous. The principal features of the style are an intricate and tortuous interlacing of narrow threads or ribands, generally in symmetrical patterns, sometimes filling up a letter, sometimes extending over a whole page; now the introduction of a number of circular ornaments, now filled by marvelously delicate spiral lines proceeding from the center, now by bolder wheel-like patterns of endless variety of design; to these may be added the use of numbers of birds and animals coiled up in endless and seemingly inextricable confusion, sometimes varied by the introduction of the human figure, and patterns formed of diagonal and straight lines, generally in squares or compartments, the idea of which some writers assert to have sprung from the remembrance of tesselated pavements." A copy of the gospels, called the *Book of Kells*, of the 7th c., is a manuscript of this style in the library of Trinity college, Dublin. This peculiar method of design was early introduced into England by Irish missionaries, and a splendid specimen of its adaptation is preserved in the celebrated *Durham Book*, in the British museum, which was executed at Lindisfarne at the commencement of the 8th century. In this may be traced at once a stronger influence of the Byzantine types; and though it is a most superb specimen of writing and decoration it does not exhibit the same originality or fertility of imagination as the works of the Irish school. From England the new style passed quickly to the continent, and was soon adopted and largely used by the illuminators, and it is curious to notice in the manuscripts of the succeeding centuries, prolific in works of splendor and elegance, the admixture of the Celtic ornament with the remains of classic design. A change of style was introduced by the illuminators of England of the 10th century. This consisted in the introduction of foliage. At first it was of an entirely rudimentary character, and exhibited none of the botanical skill or study of nature so closely observed in later times. It was, in fact, a reflection of the architectural styles then becoming dominant, the ornaments and moldings of the great architectural works of the time being now adapted to the processes of book ornamentation. A magnificent specimen of this new style still exists in the *Benedictional* of St. Ethelwold, in the possession of the family of the duke of Devonshire. This manuscript

was executed at Winchester (the great school of the arts in England) at the close of the 10th century. In the succeeding century the style became more developed, the forms of the leaves more freely drawn and less archaic, but in the 12th c. conventionalism become the rule; ornamentation had grown to be luxuriant and fantastic; and the work produced was perhaps the most magnificent of any age. By the next century the tendency was towards naturalism, and men's minds were turned to a study of living forms, with the result of a wonderful advance in the character of the work. The initial letters of manuscripts of this period became glorious in burnished gold, scarlet, and blue. In the miniatures of manuscripts gold backgrounds were constantly employed, more especially in those of French artists. In the 14th c. the gold and plain backgrounds gave way to rich patterns of diaper and checker work, and the heavy mass of burnished gold was divided into minute patterns or was entirely superseded by variegated color. In the 15th c. floral decoration became common; and the introduction of a background of pure landscape in the miniatures is a feature of this period.—Throughout the whole of the dark and middle ages the value attached to the possession of manuscripts, and the activity shown in multiplying them, are very remarkable. Long previous to the 12th c. the most active zeal was displayed in search after ancient texts, even of profane authors. "In the middle of the 9th c. Lupus, abbot of Ferrières, earnestly requested from the pope and the bishops of England and Ireland the loan of manuscripts of ancient writers, that copies might be made of them; and in 1040 count Geoffroy of Anjou gave to the abbey of Notre Dame of Saintes the tithe of the hides of the deer killed in his forests to furnish a fund to bind the books of the monastery" (Silvestre). The same writer mentions also the veneration paid in the 15th c. to the Florentine *Pandects* of the Laurentian library, a magnificent volume written in the 7th c., and esteemed the most valuable of the manuscripts of the Roman law. This manuscript was taken from Pisa by the Florentines in 1406, and after its deposition at Florence "was regarded with almost religious veneration, being shown only to the highest personages, with great ceremony, in the presence of the chief magistrate, accompanied by monks, bareheaded, and bearing lighted tapers." The price of manuscripts in the middle ages offers some interesting points for reflection. There is one account of a contract made in 1346 for writing a volume containing psalter, hymnal, and collectary, ornamented with illuminated letters in gold, azure, and vermilion, for which the charge was 16 shillings. A 14th c. Bible captured at the battle of Poictiers, sold for 100 marks, at that time a sum representing about $1500. There is a manuscript in the British museum, which was pawned by its possessor five successive times between 1483 and 1510, a fact showing how readily money could be raised at that period on this species of property: in 1488 it was pawned for 28 shillings, and in 1510 for 20 shillings. Sometimes sums of money were deposited by borrowers of manuscripts as security for their safe return.

MANUSCRIPTS, ILLUMINATION OF, the art of painting manuscripts with miniatures and ornaments, an art of the most remote antiquity. The Egyptian papyri of the ritualistic class, as old as the 18th dynasty, are ornamented with vignettes or miniatures, attached to the chapters, either designed in black outlines, or painted in primary colors *in tempera*. Except these papyri, no other manuscripts of antiquity were, strictly speaking, illuminated; such Greek and Roman ones of the 1st c. as have reached the present day being written only. Pliny, indeed, mentions from Varro that authors had their portraits painted on their works, and mentions a biographical work, with numerous portraits introduced, but all such have disappeared in the wreck of ages; the oldest illuminated MSS. which have survived being the *Dioscorides* of Vienna, and the *Virgil* of the Vatican, both of the 4th c., and ornamented with vignettes or pictures in a Byzantine style of art. St. Jerome, indeed, in the same century, complains of the abuse of the practice, as shown by filling up books with capital letters of preposterous size; but the manuscripts of this and the subsequent century are ornamented with rubrics only, as evidenced by the *Codex Alexandrinus* and other manuscripts. Probably the art of illumination was derived from rubrics, as the emperors in the 5th c., commencing with Leo (470 A.D.), signed in this color, like the Chinese; and this "vermilion reply," adopted by Charles the bold in the 9th, continued down to the 13th century. The art of illuminating manuscripts with gold and silver letters is supposed to have been derived from Egypt, but it is remarkable that no papyrus has any gold or silver introduced into it. The artists who painted in gold, called *chrysographi*, are mentioned as early as the 2d century. One of the oldest manuscripts of this style is the *Codex Argenteus* of Ulphilas (360 A.D.); and the charter of king Edgar (966 A.D.), six centuries later, shows the use of these letters. Gold letters seem to have been used in the east during the 12th and 13th centuries. At an early period, the use of illuminated or decorated initial letters commenced, which is to be distinguished from the illuminated or painted pages placed at the head of Byzantine manuscripts. Originally, they were not larger than the text, or more colored; but the Syriac manuscripts of the 7th c. have them with a pattern or border; and they go on increasing in size and splendor from the 8th to the 11th c., when large initial letters, sometimes decorated with little pictures or miniatures, came into fashion in the Greek and Latin manuscripts. The subjects of the figures mixed up with the Arabesque ornaments often referred to the texts; warriors and warlike groups of figures being introduced when the text referred to war; symbolical representations of hell, where the

chapters following treated on that region. These initial letters soon increased to a great size, being from 2 to 24 in. long; they were most used in the 8th and 9th centuries, but continued till the 12th c., and degenerated in the 16th to the last decadence of art—the grotesque. The art, which flourished in the eastern and western empires, passed over to Ireland, and there gave rise to a separate school or kind of illumination. This style, which consists in a regular series of interlaced ribbon ornaments, often terminating in the heads of gryphons and other animals, seems to have been derived from the later patterns of Byzantine art, seen on mosaics, mural paintings, and other objects. Some, indeed, have thought that they are of oriental origin. The so-called Durham book, in the British museum, of the 8th c., is a splendid example of the school which was established in Holy island by St. Aidan, and in Kent by St. Dunstan, before the end of the 6th century. A remarkable MS. of the 6th c. is the book of Kells (q.v.), at Dublin. The scriptorium of the monastery at Hyde, near Winchester, was celebrated at this period for its illuminations; and the celebrated St. Dunstan of Glastonbury applied in early youth his talents to this art. The minute size and number of interlacements of the *Book of Kells*, at Dublin, is quite wonderful; while the *Benedictional* of Chatsworth, executed by one Godemann of Hyde for Ethelwold, bishop of Winchester (1100 A.D.), exhibits a bold style of art and ornament. Separate schools prevailed in the 11th c., the Greek or Byzantine manuscripts of the period exhibiting a fine style of ornament derived from the Byzantine school; while the Latin manuscripts of the period are distinguished by the use of a light blue and green in titles and pictures. While, however, the ornaments of the Byzantine and Latin schools were of a more purely architectural character, and the Anglo-Hibernian, Saxon, and even Franco-Gallic manuscripts of Charlemagne and his successors exhibit a union of Roman and Gaulish treatment; a new kind of work arose in the 10th c. in England, called the Opus Anglicum, resembling more in character the ornaments of Gothic architecture, a remarkable specimen of which is seen in the gospels made for Knut or Canute. During the 12th c., there arose a new style, distinguished by the profusion of its ornamentation, intricate mode of illumination, and abundant use of gold and silver. The taste was false, but the art had become more special, blank spaces being left for the limners to fill in. In the 13th c., the art still more deteriorated in western Europe—long-tailed illuminated initial letters were introduced; the background was often of gold, on which the ornaments and subjects were colored in a style resembling oil-painting, from 1190 to 1230; manuals were then prepared to instruct the limner, and the art was formalized. The Gothic style of ornament of this age had superseded the Roman or Byzantine of previous centuries. In the 14th c., the art greatly improved; the border or ornament running all round the page was introduced, and the ornaments were interpolated and enriched with miniature pictures, even by celebrated artists, as Niccolo Pisano, Cimabue, Giotto, in Italy. Few volumes, however, were illuminated till after the reign of Edward I., when the art took a further development; grotesque figures were introduced, and are alluded to by writers of the period. In the 15th c., continuous borders and fine miniature pictures were in use, and toward the end of the century, celebrated works of this nature were produced by Giulio Clovio in Italy, and Lucas van Leyden in Flanders, the Van Eycks, and Memling or Hemlink; medallions of exquisite style and finish were inserted in the border. Of this age, the most beautiful known specimen is the *Book of Hours* of Anne of Brittany, wife of Louis XII., with borders of natural plants on a gold ground. The Italian art of the same age was symmetrical rather than picturesque and naturalistic, but on solid backgrounds; the ornaments, although resembling those of preceding centuries, are distinguished by the introduction of miniatures. In the 16th c., in the reign of Louis XIV., the art became extinct, ending with a style of painting called *camaïeu gris*, a kind of monochrome, in which the lights are white or gold, and shaded so as to emulate bas-reliefs. Among oriental nations, the Persians, Hindus, and Chinese have illuminated manuscripts of great beauty, none of which, however, can compete with those of the western nations in antiquity. For beauty of design, some of the Arab manuscripts are charming, but their antiquity does not reach beyond the 13th century. The Chinese Buddhists have also illuminated classics, or religious books of their sect, one of which, the *Diamond Book* as it is called, in the British museum, has a text splendidly printed in silver and gold letters on a blue ground; and the vignettes charmingly painted *in tempera*, on macerated leaves of the *ficus Indica*.

Humphrey, H. Noel, *Art of Illumination* (12mo, Lond. 1849); Shaw's *Illuminated Letters* (fol. 1828); Bradley, J. W., *Manual of Illumination* (12mo, Lond. 1860).

MANUTIUS, ALDUS (*Aldo*, a diminutive of *Theobaldo*, his baptismal name), a great printer and improver of the art of printing. His name, in its Italian form, is spelled in three different ways by himself or his descendants, viz., Manuzio, Manuzzi, and Manucci; while from his patron, Alberto Pio, lord of Carpi, he took also the name of Pio, and after the year 1503, always designates himself Aldo Pio Manutio Romano. He is often called Aldus *the Elder*. He was born at Bassiano, near Velletri, in the states of the church, in 1449, and established a printing-press at Venice in 1490 (though the first book bearing a date has 1494), from which many works were issued (see ALDINE EDITIONS). He died 1515.

MANUTIUS, or MANUZIO, ALDUS, or ALDO, the Younger, 1547–97; b. Venice; son of Paulus Manutius. He was remarkably precocious, publishing a collection of specimens from Latin and Italian literature when only 11 years of age; and a work on Latin orthography when 14. He was not, however, so successful in after-life as his boyhood promised. He succeeded to the printing business of the family, but was less qualified than his predecessors in the management to conduct it to advantage. He retired from the business in 1584, resigning it into the hands of one his employees; and during the remainder of his life was professor of belles-lettres in Bologna, Pisa, and Rome. He possessed considerable learning, and edited some of the classics for publication.

MANUTIUS, or MANUZIO, PAULUS, or PAOLO, the Younger, 1512–74; b. Venice; youngest son of Aldus Manutius; and, like his father, a printer and editor. He had the charge of the business of the family after the death of his uncle; and having surrounded himself with the available learning of the period and region, he devoted himself to the production of the Latin classics in valuable revised editions. On the foundation of the Venetian academy in 1558 he received the appointment of professor of eloquence and director of the academical press. In 1561 he went to Rome to superintend the printing of the works of the fathers. His impressions bear favorable comparison with those of his father; and besides being a man of mechanical knowledge, skill, and taste as to the prosecution of his art, he was a scholar of much erudition, and a critic of acumen. He translated into Latin the *Philippics* of Demosthenes; and published commentaries on the *Familiar Letters* of Cicero; and the *Orations;* as well as scholia on the oratorical and philosophical treatises of the same author. See ALDINE EDITIONS, *ante.*

MANZANA'RES, a t. in Spain, in New Castile, province of Ciudad Real, 98 m. s. of Madrid, situated in a vast plain 1882 ft. above the sea level; pop. 10,275. The high-road of Andalusia, which passes through it, forms its main street. The houses are well built, with open courts, which are covered in summer with awnings. It contains good schools, a hospital, and a parish church of modern Gothic architecture. The country around is flat, requiring irrigation to render the soil productive. The climate is healthy and delightful; productions are wheat, rye, anise, saffron, potatoes, wine, and oil. There are manufactures of linen, woolen cloths, soap, and brandy; and the town has a reputation for the manufacture of carriages, and for iron work.

MANZANILL'O, a t. on the s.e. coast of the island of Cuba. It has a good harbor and carries on a considerable export trade in sugar, tobacco, and timber. Pop. 5,643.

MANZONI, ALESSANDRO, one of the most admired of modern Italian novelists, was born at Milan in 1784, of noble parents, his father being count Manzoni, and his mother the gifted daughter of the great savan marquis Beccaria. From a youth, the literary predilections of Manzoni gave good promise of his after mental development. In 1806, at the age of 21, his essay on poetry, entitled *Versi Sciolti,* was inspired by the death of Carlo Imbonati, an intimate family friend; and in 1810 his sacred lyrics met with general admiration. Several tragedies, written with much spirit and originality, attracted notice not only in Italy, but in France and Germany; and foremost amid the warm admirers and favorable critics of Manzoni stood Goethe. The work, however, by which Manzoni attained to European fame is his historical novel, *I Promessi Sposi*—a Milanese story of the 17th c., translated into German, English, French, and other tongues—(3 vols. Milan, 1827), by which a new era may be said to have been created in the fictitious literature of his country. The tale abounds in interesting sketches of national and local Italian customs and modes of life, portrayed with unflagging spirit and humor, while various grave historical events are narrated with force and grandeur of style, especially the episode of the plague in Milan. Manzoni's ode to Napoleon (1823) is noble in thought and diction. The poet's later years were spent in strict and devout seclusion, the free tendency of his early opinions having been succeeded by a stringent conformity to the doctrines of Rome. A complete edition of Manzoni's works, in 5 vols., was published by Tommaseo in Florence (1828–1829). He died in 1873.

MAOR, the royal official who, in the early periods of Scottish history, was placed over crown or fiscal lands, and at an after-time became the thane. A similar official, the maer, existed in Wales.

MAORIS (pronounced *mou'ris,* a word meaning *indigenous*) is the name given to themselves by the inhabitants of New Zealand, and that by which they are now usually designated by ethnologists. The Maoris, in common with the natives generally of Polynesia, belong to the Malay race or family of mankind. Though calling themselves indigenous, the Maoris have a tradition that their ancestors migrated to the present seat of the nation from the island of Hawaiki about 500 years ago. They came in 7 canoes, which had outriggers, to prevent foundering, and were called amatiatia, being very different from those subsequently used by them, which were much simpler in construction, and named wakka. The first of these canoes that touched at New Zealand was named Arawa, and this brought over the first settlers from whom the Maoris are descended. If any faith is to be attached to this tradition, Hawaiki was, probably, the same as Hawaii, the principal of the Sandwich islands, distant about 4,000 m. n.e. of New Zealand. Some, however, suppose that it may have been Savaii, one of the

Samoan or Navigators' islands, a group not half that distance away. The tradition says nothing of any indigenous population found in New Zealand before the arrival of these immigrants. Many writers, however, incline to the belief that it was previously inhabited by a darker race, somewhat akin to the Papuas of New Guinea, sometimes called Negritos and Pelagian negroes. Supposing that the two races, in process of time, intermingled, this might account, in some measure, for the differences apparent between the Maoris and the Tahitians, Samoans, Sandwich islanders, and other natives of the Pacific. But whether of pure or mixed race, all testimony combines in representing the Maoris as a nation standing very high in the scale of humanity. The skin of the Maoris is in general of an olive-brown color, but there are some in whom the shade is much lighter, while in others it is darker. In stature they almost equal Englishmen, and have a powerful muscular development. They have well-shaped, intellectual heads, and their features, when not tattooed, might almost be taken for European. Few of them have beards or whiskers, it being an immemorial custom with them to pluck out the hair on the face with pipi shells. On the head, the majority have long black hair, with a slight wave in it; but with some it is of a reddish tinge, and some Maoris again have the hair slightly frizzled. Their eyes are large, their lips thick, and their teeth, unlike those of most savage nations, are large and irregular. The women are of less stature than the men in proportion, and are in other respects inferior to them, perhaps from their marrying too young, and having to perform too much of the drudgery of life. Some of the women, however, are represented as being delicately molded, with long eye-lashes, pleasing features, and a plaintive, pathetic voice, which makes them highly interesting. Both sexes used to practice tattooing, a custom which has been almost abandoned since the conversion of the Maoris to Christianity. It was a painful operation, performed with a hammer and saw-like chisel. The punctures were stained with vegetable dyes, and the patterns, which extended over the face, hips, thighs, etc., represented ornamental scrolls and figures, supposed to denote the rank of the individual wearing them. The women were but slightly tattooed, with a few lines on the lips, chin, and occasionally other parts of the body. The priests were the principal operators, and during the process, ancient songs were sung, to encourage, divert the attention, and increase the patience of the sufferers. This tattooing was supposed to make the Maori youth more terrible in the eyes of his enemies, and more acceptable in those of his mistress. Another remarkable custom among the Maoris was that of the *taboo*, by which the priest could make certain persons and things sacred and inviolate. This was partly a religious and partly a political ordinance, and was so much respected that even in war-time hostile tribes left unharmed all persons and things thus protected by the *taboo* of the opposite side. Cannibalism, a much more heinous and abominable custom, practiced so lately as within the last 45 years, was universally prevalent among the Maoris before their conversion to Christianity. The last instance of it occurred in the year 1843. "Now, however," says Dr. Scherzer (*Voyage of the Novara*), "any allusion to this revolting practice is very painful to the New Zealander, as reminding him of his former low position in the scale of nations. Every time that we endeavored to make any inquiry of the natives respecting this custom, they withdrew with an ashamed look. In like manner, dogs' flesh has ceased to be an article of food, ever since the introduction of pork by capt. Cook. Formerly, the native or Maori dog, which at present is very scarce, was eaten on certain occasions, while its blood played a somewhat conspicuous part in Maori pharmacy." Infanticide, which also prevailed largely among them in their days of heathenism, is now universally abolished, and the same is the case with slavery and polygamy. The Maoris generally marry very young, and instances are known of females among them becoming mothers even at the tender age of 11 years. Their marriages, however, are not very productive, 3 in a family being considered a good average, and many of these dying in their first year. It is difficult to account for this, seeing that the Maoris of the present day are not addicted to intemperance, like other half-civilized tribes. The wars of the Maoris were formerly carried on with spears and clubs of various kinds, manufactured from stone and wood. Their most remarkable weapon was a spear of nephrite, which descended among the principal chiefs from father to son, and was regarded as a kind of scepter, and even a sacred object. It was called *merimeri*, "the fire of the gods," and was sometimes used for scalping prisoners. There are other weapons of nephrite in use among the Maoris; they are much sought after, and very costly. The use of fire-arms is now, however, very general among the Maoris, and that they are adroit marksmen has been made but too apparent in their contests with English troops. The language of the Maoris, like the Polynesian languages generally, belongs to the Malay family. Its alphabet comprises only 14 letters, viz., A, E, H, I, K, M, N, O, P, R, T, U, W, and Ng. Seven tolerably distinct dialects are spoken among them. The language is represented as rich and sonorous, well adapted for poetical expression, especially of the lyric kind. The Maoris have an abundance of metrical proverbs, legends, and traditions, of which a collection has been made by sir George Grey. They are also passionately attached to music and song. More than five-sixths of the Maoris are now converted to Christianity. Of these, such as live within the English settlements are becoming gradually assimilated to our own colonists, for the most part wearing the European dress, etc., while those further removed are content with the blanket, which has come to supersede the native

cloth. They generally practice agriculture, but will not work very hard. They are good sailors and fishermen, and, indeed, more than a hundred coasting-vessels of a good size are now the property of natives. The Maoris, however, as a nation, although ready to imitate our manners and customs, are not quite content with our colonial rule, and have frequently raised the standard of revolt against Britain under their native chieftains. In 1861 hostilities commenced between the Maoris and the British, which terminated in favor of the latter the following year. In 1863 war broke out again, the Maoris having conspired to expel the British troops. In 1868 they massacred many of the settlers, and resisted, to desperation, the troops sent to quell them—a feat accomplished the following year. Pop. '68, only 38,540.

MAORMOR, the old equivalent of the earl in Scotland, an official similar to a maor (q.v.), but placed over a province instead of a thanage, an earldom or county instead of a barony, exercising the office of royal deputy or steward over the territory of which he had at a still earlier period been the independent lord, and probably retaining to himself the third part of the royal revenues and prerogatives. Prior to the introduction of feudalism, Scotland seems in theory to have been subdivided into maormordoms, each made up of the maormor's portion and the king's, in later language, the earldom and the regality, over both of which the maormor exercised his office, though the former was, in a special sense, his own. Practically, however, in certain of these districts the king retained both maormordom and regality in his own hands, and the maors held their thanages directly of the sovereign, without the intervention of a maormor. As the feudal system extended, the maormors were converted into earls, who were confined within the limits of their own districts, the earl of Fife alone retaining the privilege of exacting his rights over the whole province.

MAP (Lat. *mappa*, a towel). A map is a delineation, on a plane, of some portion of the surface of a sphere, celestial or terrestrial, on which the objects intended to be shown are traced, whether stars or towns, mountains, etc. Terrestrial maps are termed *geographical*, when they refer to the land; and *hydrographical* maps, or *charts*, when they delineate the shores of the sea. A perfect representation of a country, with all its parts in true proportions and relative positions, may be made on a globe; but, since the surface of the earth is spherical, it is not possible so to delineate any large portion of it on a plane as to retain these properties. Hence geographers resort to different methods of representation called projections (q.v.), which are of two kinds—either real perspectives from different points of view, or approximative developments. The five principal projections are—the orthographic, the stereographic, the globular, the conical, and the cylindrical, or Mercator's.

In the first of these, the flat surface on which the map is drawn is supposed to pass through the center of the earth, and according to the distance of the eye, the projection is either of the first, second, or third kind. In the *orthographic*, the eye is assumed to be at an infinite distance from the center of the earth, so that all rays of light proceeding from every point in its surface are parallel and perpendicular.

From the nature of this projection, it is evident that while the central parts of the hemisphere are almost accurately represented, towards the circumference the countries are crowded together and diminished in size. On this account it is of little use for geographical, though of considerable value for astronomical purposes. In the *stereographic*, the eye or point of projection is assumed to be placed on the surface of the sphere opposite the one to be delineated. If the globe were transparent, the eye would then see the opposite concave surface. Contrary to the orthographic, this method contracts the center of the map, and enlarges it towards the circumference. Owing to the unequal area of the divisions, and the difficulty of finding the true latitude and longitude of places, this projection is not much employed. In order to rectify the opposite effects of the two preceding, the globular projection, a modification of the two, is generally adopted. If we suppose the eye to be removed from the surface to a distance equal to the sine of 45° of the circumscribing circle, the projection is called globular. In other words, if the diameter of the sphere be 200 parts, it must be produced 70 of these parts in order to give the point of projection.

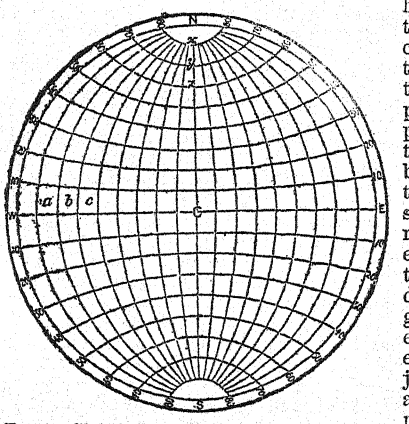


Fig. 1.—Globular, or Equidistant Projection of a Hemisphere.

All meridians and parallels in this projection are in reality elliptical curves, but as they approach so nearly to being circular arcs, they are very rarely shown otherwise.

The construction of the globular or equidistant projection is as follows (fig. 1): Describe a circle NESW, to represent a meridian, and draw two diameters, NCS and WCE,

perpendicular to each other, the one for a central meridian, the other for the equator. Then N and S will represent the north and south poles. Divide each of the quadrants into 9 equal parts, and each of the radii CN, CE, and C also into 9 equal parts. Produce NS both ways, and find on it the centers of circles which will pass through the three points 80 *x* 80, 70 *y* 70, etc., and these arcs described on both sides of the equator will be the parallels of latitude. In like manner, find on WE produced, the centers of circles which must pass through *a*, *b*, *c*, and the poles. Having selected the first meridian, number the others successively to the east and west of it. A map in this way may be constructed on the rational horizon of any place.

The impossibility of getting a perfect representation of special parts of the sphere by any of the previous methods, led to the desire for others less defective. Of all solid bodies whose surfaces can be accurately developed or rolled out upon a plane without alteration, the cone and cylinder approach nearest to the character of the sphere. A portion of the sphere between two parallels not far distant from each other, corresponds very exactly with a like conical zone; whence it is that conical developments make the best projections for special geographical maps, and even with some modifications for large portions of the globe.

A conical projection of Europe (fig. 2) is constructed thus: Draw a base line AB of indefinite length; bisect it in E, and at that point erect a perpendicular ED, to form the central meridian of the map. Take a space for 5° of latitude, and since Europe lies between the 35th and 75th parallels of latitude, mark off eight of these spaces along ED for the points through which the parallels must pass. The center from which to describe the parallels will be the point in ED where the top of a cone, cutting the globe at the 45th and 65th parallels, would meet the axis of the sphere. This point will be found to be beyond the north pole at C. Since on the parallels of 45° and 65°, where the cone

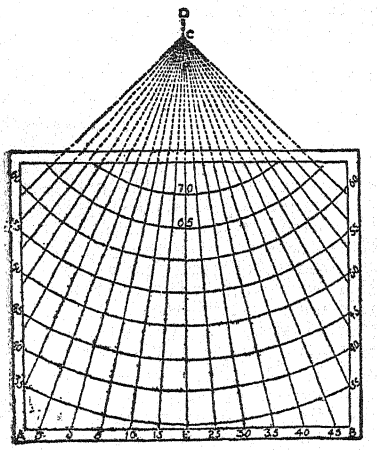


FIG. 2.—Conical Projection of Europe.

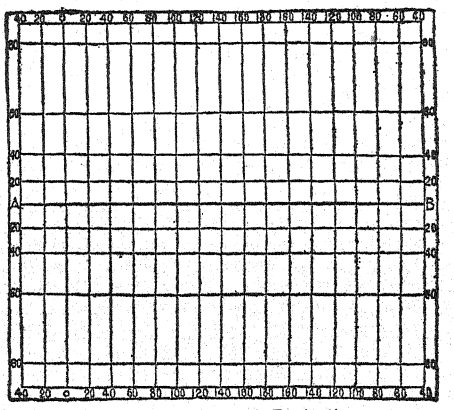


FIG. 3.—Mercator's Projection.

cuts the sphere, the degrees of longitude are exactly equal to those on the globe, if on these parallels distances be marked off equivalent to 5 degrees of longitude, in proportion to the degrees of latitude in those parallels, and through these points straight lines be drawn from C, they will represent the meridians for every 5 degrees.

Since all meridians on the globe are great circles passing through the poles, the north and south points at any place correspond with the poles of the earth. The east and west points, however, are indicated by a line at right angles to the meridian, and do not, except at the equator, correspond with those of the earth. In all the projections hitherto described, the direction either of the north and south, or of the east and west points, is represented by a curved line, so that on such a map the course of a vessel would almost always be laid down in a curve, which could only be described by continually laying off from the meridian a line at an angle equal to that made with the meridian by the point of the compass at which the ship was sailing. If the vessel were to steer in a direct n.e. course by one of the previous projections, she would, if land did not intervene, describe a spiral round, and ultimately arrive at the north pole: therefore, the mariner requires a chart which will enable him to steer his course by compass in straight lines only. This valuable instrument is supplied by Mercator's chart, in which all the meridians are straight lines *perpendicular* to the equator, and all the parallels straight lines *parallel* to the equator.

It is constructed as follows (fig. 3): A line AB is drawn of the required length for the equator. This line is divided into 36, 24, or 18 equal parts, for meridians at 10°, 15°, or 20° apart, and the meridians are then drawn through these perpendicular to AB. From a

table of meridional parts (a table of the number of minutes of a degree of longitude at the equator comprised between that and every parallel of latitude up to 89°), take the distances of the parallels and of the tropics and arctic circles from the equator, and mark them off to the north and south of it. Join these points, and the projection is made.

This projection, of course, does not and is not intended to give a natural representation of the earth, its effect being to exaggerate the polar regions immensely. The distortion in the form of countries and relative direction of places, is rectified by the degrees of latitude being made to increase proportionably to those of longitude. This is the only map which gives an unbroken view of the whole surface of the earth.

The term *map* is specially applied to representations of land, or land and water together; while that of *chart* is limited to the coast and water surface only, showing currents, rocks, anchorage, light-houses, harbors, soundings, and other objects of importance to seamen.

A geographical map proper is a general map of the world, or of a large extent of country. A topographical map differs from it in being limited in area, and much more detailed. The ordnance survey of Britain is a good example of a topographical map. Besides purely geographical and topographical maps, others are constructed for special purposes, which may be physical, political, or civil, military, statistical, historical, etc.

In order to construct a map, and to determine accurately the positions of places on it, a knowledge of two elements is essential—viz., latitude or distance from the equator, and longitude or distance east or west of the meridian adopted.

Every map, whatever its dimensions, is in some definite relation to the actual size of the globe. This relation is indicated by a scale—a graduated line showing, by its divisions, the number of miles corresponding to any space measured on the map. The scales of geographical maps range from about 800 m. to an inch (for maps of quarters of the globe) to 10 m. to an inch; those of topographical maps range from 1 in. to 25 in. to a mile, the largest topographical maps we have, admitting of the most minute details.

The ordnance survey of Great Britain is on the scale of $\frac{1}{63360}$ of nature, or 1 in. of paper to 1 m. of surface.

A recent improvement introduced into our best maps is that of printing the watercourses in blue ink, making the orography and skeleton of every country stand out in clear relief, thus avoiding the confusion resulting from all the lines being black, as in older maps.

MAPES, James J., ll.d., 1806–66; b. New York, where he was for a time a merchant and sugar-refiner, then professor of chemistry and natural philosophy in the national academy of design. He was the inventor of various useful processes in industrial chemistry. In later years he entered into the business of a scientific agriculturist near Newark, N. J., and was very successful. His knowledge of chemistry made him an expert in fertilizers, in which he was an extensive dealer. He was for a time editor of the *Working Farmer*, and published many papers and addresses on chemistry and agriculture. He also published the *American Repository of Arts*, etc., in 4 vols., the *Practical Farmer*, and other works. He spent considerable time in investigating the phenomena of spiritualism, with what conclusion is unknown. Died at Newark.

MAPES, or **MAP**, Walter, a famous mediæval writer of Latin verse, called by lord Lyttleton "the Anacreon of the 12th c.," was b. somewhere on the frontiers of Wales (probably Herefordshire) before 1150. He studied at Paris, and on his return to England found entrance to the court, became a favorite with Henry II., and was made archdeacon of Oxford in 1196, after which he does not again appear in history. He is thought to have died about 1210. Mapes's best known piece is the drinking-song, beginning

Meum est propositum in taberna mori,

which has been charmingly rendered into English by Leigh Hunt. It is part of a longer poem entitled *Confessio Golie*. Considerable doubt, however, is now felt as to the proper authorship of the poems commonly attributed to Mapes; and Mr. Wright, who has edited them for the Camden society (1841), brings forward several reasons for concluding that the author must be a different person from Mapes. The most weighty of these reasons is, that Giraldus Cambrensis, the intimate friend of the archdeacon, severely censures the poems that went under the name of Golias, of which the famous drinking-song was one, while in the same breath he warmly praises Mapes. It is certain, however, explain it as we may, that soon after the time of the archdeacon they were regarded as his, and his name is inscribed on them in MSS. of the 14th and 15th centuries. Mapes also wrote several prose works in Latin and Anglo-Norman.

MAPIMI, a desert in n. Mexico, extending s. from the Rio Grande 4½ degrees of latitude, and being about 2½° in width, or about 525 sq. miles. The name is taken from a mining town of about 5,000 pop. on the border of the desert. There is very little vegetation, but the presence of gold, silver, iron, and coal is claimed. Parts of Chihuahua, Durango, and Coahuila are included in the tract.

MAPLE, *Acer*, a genus of exogenous trees of the natural order *aceraceæ*. This order contains more than sixty species, natives of the temperate parts of the northern hemisphere, and particularly numerous in North America and the n. of India. They have

opposite leaves without stipules, usually lobed or palmate. The flowers are in axillary corymbs or racemes, small, but abounding in honey, and very attractive to bees. The calyx is generally divided into five segments; the petals, when present, equal in number to the segments of the calyx, grow from the margin of a fleshy, hypogynous disk. The fruit is formed of two small winged nuts, each with one or two seeds. With few exceptions, the genus *acer* includes the whole order.—The COMMON MAPLE (*A. campestre*), a small tree, is a native of Britain, and of many parts of Europe and Asia. The leaves are small, and usually five-lobed; the wood is compact, fine-grained, takes a high polish, and is much used by turners and for carved work. Several nearly allied species are found in the s. of Europe.—The STRIPED BARK MAPLE (*A. striatum*) of North America, where it often forms great part of the undergrowth in woods, is remarkable for longitudinal black and white stripes on its bark; and its wood, which is very white, is used for inlaying in cabinet-work.—The GREATER MAPLE or SYCAMORE (*A. pseudo-platanus*), commonly called *plane-tree* in Scotland, is a native of various parts of Europe, but a doubtful native of Britain, in which, however, it has long been common. It attains a height of 70 to 90 ft., has a spreading umbrageous head, and large, palmate, coarsely serrated leaves on long stalks. It is of quick growth, and succeeds well near the sea, and in other exposed situations. The wood is white, compact, and firm; not hard, but capable of a fine polish; and is used by wheelwrights, turners, etc. It is not apt to warp. Stair-rails are often made of it, and pattern-blocks for manufactories, as well as bowls, bread-plates, etc. Sugar is sometimes made from the sap of this tree, as from that of several other maples; but the species which yields it most abundantly is the SUGAR MAPLE (*A. saccharinum*) of North America, a species which much resembles the sycamore, and abounds in the northern parts of the United States and in the British possessions, where large quantities of sugar are made from it, although only for domestic use. The trunk of the sugar maple is generally more slender than that of the sycamore. To obtain sugar, holes are bored in the trunk when the sap is ascending, early in spring, before the winter frost has passed away, in an obliquely ascending direction, at no great distance from the ground, at first only to the depth of half an inch, but afterwards deepened to 2 in.; and the sap thus collected is evaporated in boilers over a brisk fire, to the consistency of syrup, strained and poured into molds, in which it crystallizes into a coarse gray or brown colored sugar. It is sometimes afterwards refined. Four gallons of sap yield about 1 lb. of sugar. A single tree yields from 2 to 6 lbs. in a season. During the sugar-making season, sheds are erected in the woods for the boiling and other processes of the manufacture. The sap cannot be kept long after being collected. Good vinegar is made from it, and a kind of molasses much superior to that from the sugar-cane, and much used in America with buckwheat cakes, etc. The wood of the sugar maple has a satiny appearance, and is used for cabinet-making; it is sometimes finely marked with undulations of fiber, and is then known as *bird's-eye maple*, and is used for veneers. The cultivation of the sugar maple in Europe, for the sake of its sugar, has of late been much advocated. It is not so hardy in the climate of Britain as the sycamore, and seems to require a dry and sheltered situation.—The NORWAY MAPLE (*A. platanoides*) is a native of the n. of Europe, although not of Britain, and is also found in North America. It much resembles the sycamore, and its wood is used for the same purposes. It is pretty common in plantations in Britain.—A Himalayan species (*A. villosum*), a noble tree, found with pines and birches of great elevations, has recently been introduced into Britain.

MAQUET, AUGUSTE, b. in Paris, 1813; educated at the college Charlemagne, where he was for a time teacher. Having written the drama entitled *Bathilde*, he was introduced to Alexandre Dumas to have it examined. The latter was struck with his talent, and proposed their working together. It is said that a considerable part of the romances which Dumas published previous to 1845 were largely from Maquet's pen. In 1851 he began publishing romances under his own name, which are highly appreciated in France. He has been president of the commission of dramatic authors and composers. His work in aid of Dumas embraced fifteen of his most famous novels. Under his own name since, are the romances *Histoire de la Bastille; Prisons de l'Europe; Belle Gabrielle;* and many others. For the theater he has prepared *La Fronde*, an opera; *Le Château de Gautier; Le Comte de Lavernie; La Belle Gabrielle;* and many others, in addition to the joint works of himself and Dumas, most of which he dramatized.

MAQUI, *Aristotelia maqui*, the only known species of a genus of plants sometimes referred to the natural order *tiliaceæ*, and which has also been made the type of a proposed order. It is an evergreen or sub-evergreen shrub, of considerable size, a native of Chili. The flowers are small, green, and yellow, in axillary racemes of no great beauty. The fruit is a three-celled berry, about the size of a pea, black, acid, and eatable; the Chilians make a wine from it. The wood is used for making musical instruments, and the tough bark for their strings. The maqui sometimes ripens fruit against a wall in England, and is frequently cultivated as an ornamental shrub.

MARA'BOU FEATHERS. See ADJUTANT.

MARABOU' STORK, the African name of the adjutant stork, pouched adjutant, or argala of India. The sausage-like pouch which hangs from its neck is capable of being inflated, giving the bird a strange appearance. It is gregarious in its wild state, fre-

quenting the mouths of rivers, and living upon animals too large for other storks to swallow. It is easily domesticated, but its exceeding voracity impels it on every occasion to purloin chickens, turkeys, legs of mutton, cats, puppies, etc., swallowing them whole. Land tortoises 10 in. long have been found in its maws. See ADJUTANT, *ante*.

MAR'ABUTS, a name given to the descendants of the *Moravides* (Arab. frontier inhabitants), a certain Arabic tribe, which, in 1075, founded a dynasty in the north-western parts of Africa, and held Morocco and Spain for a considerable period. The Almohads having put an end to their temporal dominion, their descendants exercise to this day a kind of spiritual superiority over the Moslem negroes in Barbary, the coast of Guinea, etc. They form a kind of priestly order, officiating at mosques and chapels, explaining the Koran, providing the faithful with amulets, prophesying, and working miracles. They are looked up to with great awe and reverence by the common populace, who also allow them a certain vague license over their goods and chattels—their wives not excluded. The great marabut ranks next to the king, and the dignity of a marabut is generally hereditary. One of the most eminent marabuts of our day was the late Abd-el-Kader (q.v.).

MARACAY'BO, a fortified city of the South American republic of Venezuela, is situated on a sandy plain on the w. shore of the strait which connects the lake of Maracaybo with the gulf of the same name. Lat. 10° 45′ n., long. 71° 40′ west. It is the chief town of the state of Zulia (formerly called Maracaybo), comprising the territory surrounding the lake of Maracaybo, and containing 33,075 sq.m., and a pop. of about 90,000. It is a handsome town, with a hot but healthy climate, and has a harbor deep enough to contain the largest vessels, but inaccessible to them, owing to the shifting bar at its mouth. The chief articles of export are cocoa, coffee, hides and skins, fustic, dividivi, the balsam of copaiba, and cotton. In 1871–72, 23,000,000 lbs. of coffee were exported. Pop. '73, 21,954.

MARACAYBO, LAKE and GULF. The lake of Maracaybo, in the n. of Venezuela, is about 100 m. in length and 70 m. in breadth. It is of considerable depth, but the bar at its mouth prohibits the entrance of large vessels. It is connected with the gulf of the same name by a strait upwards of 20 m. in length, and from 5 to 10 m. in breadth. The gulf is a wide inlet of the Caribbean sea, 150 m. from e. to w., and about 75 m. from n. to south.

MA'RAGHA, an old t. of Persia, in the province of Azerbijan, 50 m. s. of Tabriz, on a tributary of lake Urumiah. It is surrounded by walls, and was long the capital of the province. It contains two bridges of the 11th c., and the remains of the observatory of the celebrated mediæval astronomer, Nasir Eddin. Pop. 15,000.

MARAJO', an island on the n.e. coast of Brazil, belonging to the province of Para, and situated between the estuaries of the rivers Amazon and Para, is 180 m. in length by 125 m. in breadth. In the n.e. it is somewhat elevated, without trees, and covered by herds of cattle. The western portion is low, and watered by numerous streams. Pop. estimated at 20,000.

MARANHAM', or MARANHAO, a rich and important maritime province of the empire of Brazil, is bounded on the n. by the Atlantic ocean. Area, 141,939 sq.m.; pop. '72, 380,000. The surface is uneven, but there is no range of mountains. It is quadrilateral in shape, and is watered by numerous rivers, which, falling into the Atlantic, traverse its whole length in a direction parallel with its sides. Its climate is fine, and its soil produces vast quantities of rice, for the production of which it is peculiarly fitted. Cotton, sugar-cane, and fruits are also extensively grown. Its surface is still to a great extent covered with forests; iron and lead ores and antimony have been discovered; and sheep, cattle, and horses are extensively reared.—The chief city is Maranham, or San Luiz de Maranham, the fourth in rank and importance, and the best-built city in the Brazilian empire. It is situated on an island of the same name, in lat. 2° 30′ s., long. 44° 18′ w., is remarkably clean, gay, hospitable, and prosperous, and has a pop. of 36,000. Maranham is the seat of a bishop, contains a cathedral, 10 churches, several monasteries and convents, a lyceum, and other educational institutions.

MARAN'O, a t. of the province of Naples, situated on a gentle slope 4 m. from Naples. Pop. 7,302.

MARAÑON. See AMAZON, *ante*.

MARANS, a t. of France, department of Charente-Inférieure, near the union of the Sèvre-Niortaise and the Vendée, 13 m. n.e. of La Rochelle; pop. 3,217. It is well built, has a good bridge over the Sèvre, which is navigable here for vessels of 100 tons. By a canal recently constructed, ships of 300 tons can come to the town. The trade is principally in corn, wine, brandy, hemp, flax, timber, and salt. The surrounding country having been recovered from the sea, abounds in salt marshes, and is intersected by canals.

MARANTA'CEÆ, or CANNACEÆ, a natural order of endogenous plants, very nearly allied to *scitamineæ* (q.v.), and differing chiefly in having all the stamens petal-like, and the one fertile stamen lateral. They are destitute of the aromatic property so general in the *scitamineæ*. There are about 160 known species, all tropical or sub-tropical. They

are all herbaceous perennials. Not many of them are large or notable for the beauty of their flowers. The tuberous root-stocks of many abound in starch.

MARASCHINO. See LIQUEUR.

MARASH', a pashalic of Asiatic Turkey, is bounded n. by that of Sivas, e. by Diarbekis, s. by Aleppo, w. by Karamania. The greatest length is 130 m. and breadth 105 m.; pop. 248,000. It belongs to the basin of the Euphrates and the Jyhoon. The former river is the e. boundary, while the latter rises near its center and flows through it s.w. The district is mountainous and wooded except in the valleys of these rivers. It is crossed from w. to e. by the Taurus ridge and by the Anti-taurus and the Durdun Tagh. The climate is mild, and the country is well adapted to pasturage. The capital is Marash on the Jyhoon, 60 m. n.e. from the sea.

MARAS'MUS is a term which was somewhat vaguely used by the older medical writers to designate those cases of general emaciation or atrophy for which they did not see any special cause. The word is now seldom used except occasionally as a synonym for *tabes mesenterica*, or tubercular disease of the mesenteric glands. See MESENTERY, MESENTERIC DISEASE.

MARAT, JEAN PAUL, one of the most infamous characters of the French revolution, b. 1744, of Protestant parents, at Baudry, in Neufchâtel. He spent some of his early years in Britain; published several treatises in London; acted as a teacher of languages in Edinburgh; and underwent punishment for stealing some valuable medals from the museum in Oxford. Afterwards returning to Paris, he practiced an inferior branch of the medical profession until the revolution brought him into prominence as a demagogue. His features and appearance were grotesque, his look wild, and his speeches extravagant, the ludicrous mingling with the terrible. His influence over the lowest classes, however, soon became great. He issued a journal, which he at first called the *Publiciste Parisien*, but afterwards the *Ami du Peuple*, which is historically connected with some of the most fearful events of that period. No falsehood was too monstrous to be published in it, no atrocity too great to be recommended. It was in a great measure the influence of Marat which led to the cruelties and massacres of Sept., 1792, in the midst of which he was elected a member of the convention, but on his appearance there he was received with almost universal expressions of abhorrence. No one would sit beside him, and when he attempted to speak a tumult always arose. His journal, now the *Journal de la République*, became more ferocious and sanguinary than ever. He demanded the sacrifice of 270,000 heads, and defended this in the convention, saying that if these were not granted, he would demand more. During the king's trial, he was urgent for his immediate execution, and in his journal called upon the people to slay 200,000 of the adherents of the old régime, and to reduce the convention to one-fourth. In April, 1793, Marat obtained the enactment of the fearful law against suspected persons, in virtue of which 400,000 were imprisoned. Robespierre, Danton, and Marat were now the triumvirate which ruled France. But on July 13, 1793, Marat was stabbed in his own house by Charlotte Corday (q.v.). This event was followed by some of the worst atrocities of the reign of terror; streams of blood flowing, as was said, to the manes of Marat, whose likeness, with gaping wounds, painted by David, was exhibited on an altar in the court of the Louvre, and then hung up in the convention; whilst it was decreed that his housekeeper, whom he had married "one fine day, in the presence of the sun," should be maintained at the expense of the state. A decree of Nov. 4, 1793, gave to Marat's remains the honors of the Pantheon; but they were cast out of it again on Nov. 8, 1795, and his picture was removed from its place in the convention.

MARATE'A, an Italian town of the province of Basilicata, situated on the slope of a mountain, in the midst of a lovely and salubrious country. Pop. 6,480.

MARATHON, anciently, a village on the e. coast of Attica, about 20 m. n.e. of Athens, now called Marathona, or, according to Leake, the present Vrana. It was situated in a plain of the same name, about 6 m. in length and 3 in breadth, with a background of mountains in the w., and a marsh both on the n. and s.; eastward, it reaches the sea. Byron's lines in the *Isles of Greece* correctly describe it:

> The mountains look on Marathon—
> And Marathon looks on the sea.

It is gloriously memorable as the scene of the grand defeat of the Persian hordes of Darius by the Greeks under Miltiades (490 B.C.).

MAR'ATHON (*ante*), was named from the hero Marathos, and known in Homer's time. Here legend relates that Eurystheus was overcome by the Heraclidæ and Iolaus, and here took place the contest of Theseus and the bull. When Pisistratus was driven from Athens to Eubœa, Marathon was the first place occupied by him on his return. On the day of the great battle the Persian forces were under the command of Datis and Artaphernes, while Miltiades had eleven generals under his orders. Ancient writers differ widely in their estimate of the numbers of the invading forces. Plato declares that there were 500,000 in all; Trogus Pompeius, 600,000, but Cornelius Nepos says that of the effective force, there were 100,000 foot soldiers, and 10,000 cavalry. This last estimate is probably near the truth, as it agrees closely with the statement of Herodotus

that the whole force was transported in 600 triremes, each carrying 200 men. All writers agree that the Greeks numbered about 10,000; so it is safe to say that they were outnumbered at least ten to one. They were materially assisted, however, by their slaves, who are not included in the 10,000. The result of the battle was due to the rigid discipline of the Greeks, in comparison with whom the Persians were but an unruly mob, and to the military genius of Miltiades. Of the 10 generals, 5 were opposed to giving battle, and the deciding vote of the polemarch was given at Miltiades's urgent persuasion. Each general in succession held the chief command for one day, and it was so arranged that the battle should take place on the day when Miltiades was in command. The Persians lost about 6,400 men; while of the Athenians only 192 fell. Among them, however, was the polemarch Callimachus, Stresbius, one of the generals, and several men of high rank. Remains of the weapons used in the contest are still to be found on the field. Two mounds or *tumuli* were erected in the center of the plain, one commemorating the valor of the Athenians who perished, and setting forth their names and rank on carved pillars, and the other raised for the Platæans and slaves. The remains of these tombs, and of the marble trophies erected, may still be seen.

MARATHON, a co. in n. Wisconsin, area, 5,520 sq.m.; pop. '80, 17,121; foreign, 6,451. It is drained by the Wisconsin river, and its tributaries, the Big Eau Claire, Big Eau Pleine, Little Eau Pleine, Clover, and others. The surface is level, and much of it is covered with a heavy growth of timber—ash, beech, birch, elm, maple, and pine. The principal crops are wheat and oats. The manufacture of pine lumber is extensively carried on. The Wisconsin Central, and Wisconsin Valley railroads pass through it. Co. seat, Wausau.

MARATTA, or MARATTI, CARLO, 1625–1713, a Roman from the Marches of Ancona; an enthusiastic disciple of the Raphael school; an admirable copyist, and one of the most conscientious and skillful of painters in restorations. It is to his unwearied industry that modern times are indebted for the degree of preservation that the grand frescos of the Vatican and the masterpieces of Raphael in the Farnese palace and elsewhere have exhibited. They had already, in his time, so altered as to threaten soon to be ruined. Maratta opposed the tendency to immense frescos, and dissuaded his pupils from works of unusual size. His forte lay in paintings where the Virgin Mary was the principal subject, and of this class nearly every gallery in Europe has his works. But he was author also of other pieces of great merit. His daughter Maria, married to Zappa, was both poet and painter.

MARAUDING (a word common, under orthographic variations, to most of the European languages, and, probably, of identical root with the verb "to mar") is irregular plunder or violence offered to the inhabitants of a country by the individuals of an army. In all armies where discipline is maintained, marauding is, at least professedly, punished by death; the provost-marshal having power to inflict that penalty summarily on all offenders taken in the act.

MARAVE'DI, an old Spanish coin, either of vellon, worth about two-sevenths of a farthing; or of silver, worth five-sevenths of a farthing.

MARBEAU, JEAN BAPTISTE FRANÇOIS; b. at Brives, in Corrèze, France 1798. After practicing and writing upon law for some years, he became interested in the unfortunate condition of certain classes around him; and in 1844, while engaged in making a report on the asylums in his neighborhood, he became greatly interested in the uncared-for children of mothers who are obliged to go out to work as soon as their children cease to nurse. He felt that there was a gap in benevolent asylums for children, and could not rest till he had done something to fill it. He opened the first *crèche*, or infant asylum, in France, and wrote a work entitled *Des Crèches*, which has been translated into several languages. The profits of its publication he gave to the infant asylums of his own neighborhood. From the beginning made by him the system has extended through France, the civilized countries of Europe, and to the United States. In 1871 there were 81 asylums for infant children in France alone. Marbeau's philanthropic works, besides *Des Crèches*, are: *Politiques des Intérêts, ou Essai sur des Moyens d'améliorer le Sort des Travailleurs* (Paris, 1834); *Étude sur l'Économie social* (1844); *Du Pauperisme en France et des Moyens d'y porter Remède, ou Principes d'Économie charitable* (1847); *De l'Indigence et des Secours* (1850).

MARBECK, JOHN, d. about 1585, was organist of Windsor in the reign of Henry VIII. and his successor. An association having been formed in 1544 in support of the Lutheran doctrines, Marbeck joined it. Among the members were a priest, a singing man of St. George's chapel, and a tradesman. They were arrested on a charge of heresy. Their papers were seized, and in Marbeck's handwriting were found notes on the Bible and a concordance in English. The special charge against him, it is said, was that he had copied an epistle of Calvin against the mass. They were all condemned to the stake, but Marbeck, on account of his musical talents, and through the interposition of Gardiner, bishop of Winchester, was pardoned, and restored to his place as organist. He lived to see the triumph of his principles, and to publish his work, *The Boke of Common Praier, noted.* A new edition was published by Robert Jones, of Ely cathedral, entitled *Marbeck's Book of Common Prayer, for voices in unison, arranged for modern use, with an ad.*

libitum organ bass accompanyment. He finished also his *Concordance.* A *Te Deum* of his, and a mass for five voices, are found in Smith's *Musica Antiqua*, now in the British museum. In 1574 was published *The Lyves of Holy Saincles, Prophets, Patriarchs, and others;* and afterwards, *The Holie Historie of King David, drawn into English meetre; A Ripping Up of the Pope's Fardel.*

MARBLE, in its strict and proper sense, is a rock crystallized in a saccharoidal manner, having the fracture of loaf-sugar, and composed of carbonate of lime, either almost pure when the color is white or combined with oxide of iron or other impurities which give various colors to it. But many other kinds of stone are popularly included under this title. Indeed, any limestone rock sufficiently compact to admit of a polish is called marble. It is only in this vague sense that the indurated amorphous rocks used in this country can receive this name. Such are the black, red, gray, and variegated limestones of the old red sandstone period, found in Devonshire, which are very beautiful from the numbers of exquisitely preserved corals which abound in them; the marbles of the carboniferous series from Flintshire, Derbyshire, and Yorkshire, so full of encrinites; the shell marbles from the oolite rocks at Rance, Stamford, and Yovil; and the dark Purbeck and Petworth marbles, beautifully "figured" with shells, from the wealden strata, which were so much used by the architects of the middle ages.

Saccharine or statuary marble is a white, fine-grained rock, resembling loaf-sugar in color and texture, working freely in every direction, not liable to splinter, and taking a fine polish. Of the marbles used by the ancients the most famous are: Parian marble, a finely granular and very durable stone, with a waxy appearance when polished. Some of the finest Grecian sculptures were formed of this marble, among others the famous Venus de Medici. The marble of Pentelicus was at one time preferred by the Greeks to Parian, because it was whiter and finer grained. The Parthenon was entirely built of it, and many famous statues still remain which were executed in this marble, but they are always more or less weathered, never retaining the beautiful finish of the Parian statues. The quarries at Carrara were known to the ancients, but they have been more extensively wrought for modern sculptors, who use this marble chiefly. It is a fine-grained, pure white marble, but is so often traversed by gray veins that it is difficult to get large blocks free from them. Of colored marbles, the best known are the rosso antico, a deep blood-red, sprinkled with minute white dots; verde antico, a clouded green produced by a mixture of white marble and green serpentine; giallo antico, a deep yellow, with black or yellow rings; and nero antico, a deep black marble.

The crystalline structure of marbles may be the original condition in which the rock was formed as a chemical deposition, in the same manner as some stalactites are crystalline, but there can be no doubt that they principally owe their structure to metamorphic action which has taken place subsequent to their deposition. This action having, at the same time, destroyed all trace of fossils, marbles were considered formerly as belonging to the primitive or metamorphic series of rocks; but, while they generally are members of one of the paleozoic formations, it is now known that some of the statuary marbles of Greece and Italy are secondary, and others even tertiary limestones.

MARBLE (*ante*). Unstratified statuary marble is white in consequence of the action to which it has been subjected during some stage of its metamorphism. It is well known that blue limestone when burned becomes white, and this discharge of color will take place even before the carbonic acid gas is expelled. Marbles may be nearly pure carbonate of lime, or they may contain a large proportion of carbonate of magnesia, in fact, may be matamorphic dolomites (q.v.). The finest statuary marble is worth from $15 to $20 per cubic foot. The Grecian and Italian marbles have been described in the preceding article. In the United States, good statuary marble has for several years been quarried at West Rutland, Vt., where a layer from 3 to 4 ft. thick is interstratified with 40 or 50 ft. of clouded marble. The finest of statuary marble is found at Pittsford, Vt., where there is a bed 20 ft. thick, from which blocks have been taken capable of taking a very fine finish, in some respects perhaps superior to Carrara, although not working with quite equal facility. Some specimens have a faintish flesh tint, scarcely perceptible, which gives a very fine effect to busts, which, as is well known, are always improved by age, when made of marble too glaringly white. The greater portion of the marble in all quarries is more or less clouded, and most of the ancient temples are built of this kind. The Vermont marbles are of the age of the Trenton limestone, forming a part of the *eolian limestone* of prof. Hitchcock, which in that locality is about 2,000 ft. thick. At West Rutland the quarry is from 40 to 60 ft. thick, at Sutherland Falls from 70 to 80, and at Pittsford 600 ft. thick. This marble belt extends n. and s. of Rutland co., through Vermont and Massachusetts, but it loses in quality in both directions. Towards the n. it is finer and harder, but less sound, and towards the s. it becomes coarser. Another belt of white marble extends along the flanks of the Alleghanies, through a part of Massachusetts, through New York and Maryland, and into Virginia beyond the Potomac river. This marble is a dolomite, and coarsely crystalline. It is quarried at various places in Westchester co., N. Y., and at Baltimore. At Canaan, Conn., and at Lee, Mass., and other places in New England, good building marble is quarried. Marble from Lee was used for the extension of the capitol at Washington. There are many varieties of colored marbles, and these are plain or

variegated. There are plain black, red, blue, gray, and yellow marbles. A jet black marble was used by the ancients. A kind found in Italian ruins is called *Nero antico*, and is now used for a ground-work for mosaics. Black marbles occur at Derbyshire, England, Kilkenny, Ireland, and at Shoreham, Vt. At Glenn's Falls, N. Y., there is a black limestone, which is used alternately with white marble for tiles, which goes under the name of black marble. The colored marbles were largely used by the Romans and Etruscans for interior decoration. A gray marble much used by the Romans in architecture was called *cipolino*, and had much the appearance of gray granite. The columns of the temple of Jupiter Serapis were constructed of this stone. There are many localities of variegated marbles in the United States. A mottled lilac, chocolate, and white, known as Tennessee marble, is regarded with favor for mantels, tables, etc. Another of red, brown, and white is quarried at Burlington, Vt., but it is rather difficult to work on account of the silica it contains.

The opening of a marble quarry is usually expensive and attended with risk, as it is impossible to determine the quality of the stone before many feet thickness of rock is removed. From 10 to 30 ft. usually has to be taken off before perfectly sound disintegrated marble is reached. After a sufficient area of surface has been prepared by the removal of the imperfect stone, channeling machines, which may be either percussion or diamond drills, are set to work, and rectangularly crossed channels are cut to a desired depth, say from 5 to 7 feet. One of the blocks, called the key block, is then broken off at the base by wedging and lifted out with a crane. This gives ready access to the others, which are then drilled as circumstances may require, broken off by wedging, and removed to a saw-mill, where they are squared or sawed into slabs.

MARBLE, MANTON, b. Worcester, Mass., 1835; graduated at the Rochester university in 1855, and made his entrance into journalism in Boston, where he was connected with the *Journal* and *Traveller*. He removed to New York in 1858, and was employed during the next two years on the editorial staff of the *Evening Post*. In 1860 he united with others in founding the *World*, of which he eventually became sole proprietor. Under his management this paper gained great influence as an organ of the democratic party, and a vigorous exponent of the principles of free trade. Early in 1876 he retired from the *World*, and was closely connected with the political movements consequent to the presidential election of that year, which was in dispute between Samuel J. Tilden and Rutherford B. Hayes.

MARBLEHEAD', a sea-port t. of Massachusetts, on Massachusetts bay, 16 m. n.e. of Boston. Its population was formerly devoted to the fisheries, but is now also largely engaged in manufacturing, chiefly boots and shoes. The town was settled by emigrants from the Channel islands. At the close of the revolutionary war there were 600 widows; and at the end of the war of 1812, 500 citizens of Marblehead were prisoners of war in England. Pop. '70, 7,703.

MARBLEHEAD (*ante*) is built upon an elevated and rocky peninsula, 4 m. in length, and 2 m. in width, projecting into Massachusetts bay. It was once a part of Salem, which it joins on the west. It is connected with Boston, Portland, etc., by a branch of the Eastern railroad. It has a deep and very convenient harbor, but the shipping interest, formerly large, has declined of late. It has two national banks, a savings bank, excellent schools, a newspaper, and well established and prosperous churches. Many of the quaint peculiarities of the first settlers from the Channel islands may still be observed in their descendants. The place presents many features of interest. It has always been distinguished for patriotism, furnishing 1000 men to the revolutionary army. In the war for the suppression of the rebellion it furnished 1440 men. A wide-spread fire destroyed a large part of its business section in 1877.

MARBLES, PLAYING, are little balls of marble or some other hard substance, used as playthings by children. They are manufactured in great quantities in Saxony for export to India, China, and the United States. A hard calcareous stone is used in Saxony. After this material has been broken into square blocks, about 150 of these blocks are thrown together into a mill. This mill is generally constructed of a stationary flat slab of stone, which has numerous concentric furrows upon its face. A block of oak of the same diameter, part of which rests upon the small stones, is made to revolve over this, while water flows upon the stone slab. The whole process requires but a quarter of an hour, and a single mill can manufacture 20,000 marbles a week. The mills at Oberstein, on the Nahe, in Germany, manufacture marbles and agates especially for the American market.

MARBOIS, BARBÉ. See BARBÉ-MARBOIS, *ante*.

MAR'BURG, an interesting old German t., in the Prussian province of Hesse-Nassau, on both banks of the river Lahn 50 m. n. of Frankfort-on-the-Main, and 49 m. s.w. of Cassel. Its situation is strikingly beautiful. It is placed chiefly on a hill, round which are built quaint old-fashioned houses, interspersed with buildings of a later date, and separated by terrace-gardens. The hill is crowned by the stately burg or castle, while at its base extends the lovely valley of the Lahn. Of the ecclesiastical edifices, the principal is the fine Gothic church of St. Elizabeth, begun 1255, completed 1283, having two towers 303 ft. in height. It was erected in honor of St. Elizabeth (q.v.), daughter of

Andreas II. of Hungary, and wife of Ludwig, landgraf of Hesse and Thuringia. From her, the ancestress of the Cassel and Darmstadt branches of the house of Hesse, is descended the present princess (Alexandra) of Wales. The castle of Marburg was built in 1065. In one of its halls, the conferences between the Wittenberg and Swiss reformers regarding the Lord's-supper took place. The university of Marburg was founded in 1527 by Philip the magnanimous, landgraf of Hesse, and soon became one of the most flourishing in Protestant Europe. Among its earliest students were the celebrated Patrick Hamilton, and William Tyndale, the translator of the English Bible. The university has four faculties—theology, jurisprudence, medicine, and arts; and comprises about forty professors, twenty lecturers, and from 300 to 400 students. It contains a library of 130,000 volumes. Extensive potteries and tanneries are in operation. Pop. '75, 9,658.

MARC ANTONIO. See RAIMONDI, *ante*.

MARCA'TO, in music, means in a strongly accentuated or marked manner.

MARCEAU, FRANÇOIS SÉVERIN DES GRAVIERS, 1769–96; a soldier and officer of the first French revolution, who joined the army as a private at the age of 16. In 1789 he participated actively in the capture of the Bastille; in 1792 was in the army of the Ardennes commanded by Lafayette. When the latter was forced to fly to avoid the guillotine of the Jacobins, Marceau persuaded the subordinate officers to remain, in a harangue closing with these words—"Our country, and not our generals, is to be defended." He continued to act faithfully in accordance with this sentiment. In 1793, at the age of 24, he was made gen. of division; and in all the campaigns—under Westermen in the Vendées, under Kleber and Jourdan—he maintained a character for chivalric courage and devotion to the republic that made his early death a grief to all France.

MARCELLI'NUS, SAINT, b. Rome, 3d c.; d. 304; elected pope, 295. But little is known of his life or administration. There is an account, said to be fabulous, of a synod held at Sinuessa, in 303 or 304, during the Diocletian persecution; and Marcellinus is said to have confessed before this synod that, at the instance of Diocletian, he had offered incense to Vesta and Isis. The synod is said to have deposed Marcellinus, who, with many members of the synod, was put to death by Diocletian. The story is denied by Augustine and Theodoret, and is now not credited by either the Roman Catholics or the Protestant controversialists. Dr. Döllinger, in his work *Fables Respecting Popes in the Middle Ages*, attempts to show that the story of the deposition of Marcellinus is a fabrication of later times. The Roman church commemorates Marcellinus April 24.

MARCEL'LO, BENEDETTO, 1686–1739; b. Italy; son of Agostino Marcello, a Venetian senator. He studied music under Gasparini and Lotti, and produced his first valuable composition in 1716, a serenata in honor of the birth of the eldest son of the emperor Charles VI. The work to which he owes his fame appeared in 8 vols., 1724–26, under the name of *Estro Poetico-Armonico Parafrasi sopra i 50 primi Salmi, Poesia di G. A. Grustiani, musica de B. Marcello, Patrizio Venezio*. The characteristics of his musical style are melody and simplicity, and a sound good taste.

MARCEL'LUS, the name of two popes, of whom the latter deserves special notice, as having, when cardinal Marcello Cervini, taken a very prominent part in the discussions of the council of Trent, over which he was appointed to preside as legate of Julius III. He is also remarkable from the minor but curious circumstance of his not complying with the ancient custom by which the pope, on his election, lays aside his baptismal name, and assumes a new one. Marcello Cervini retained on his elevation the name which he had previously borne. He was elected Mar. 9, 1555, and survived his elevation but 22 days.

MARCELLUS, M. CLAUDIUS, a famous Roman gen., of one of the most eminent plebeian families. He was consul for the first time in 222 B.C., and obtained a decisive victory over the Insubrians in Cisalpine Gaul, slaying with his own hand their king, Britomartus or Viridomarus, whose spoils he dedicated to Jupiter, and was honored with a triumph. This was the third and last occasion in Roman history on which *spolia opima* were offered to the gods. In the second Punic war, Marcellus fought as prætor, in 216 B.C., against Hannibal at Nola, in Campania; and the victory which he gained was the more important, as it showed that Hannibal was not invincible, and that the Romans had not been irreparably overthrown at Cannæ. In the course of two years he thrice repulsed the Carthaginian gen. at this place. Being consul again in 214 B.C., he was intrusted with the command of the war in Sicily. He took Leontini, massacring in cold blood 2,000 Roman deserters whom he found there, and then advanced against Syracuse, which he tried to storm. All his efforts were rendered unavailing by the skill of Archimedes (q.v.), and he was compelled to regularly blockade the city. Famine, pestilence, and ultimately treachery on the part of the Spanish auxiliaries of the Syracusans, enabled Marcellus to make himself master of the place (212 B.C.), after which the remainder of Sicily was soon brought under the dominion of the Romans. He was the first Roman gen. who adopted the practice (afterwards so common) of despoiling conquered cities of their works of art. In 210 B.C. he was again consul, and was again opposed to Hannibal, with whom he fought an indecisive battle at Numistro, in Lucania, and by whom he was defeated at Canusium, in Apulia, in 209 B.C., but on the day following retrieved the defeat. In 208 B.C. he was for the fifth time elected to the consulate, and assumed once

more the command of the Roman army against Hannibal. When out reconnoitering one day he fell into an ambuscade, and was slain. The Carthaginian gen. treated his remains with honor. It ought to be noticed that the accounts of Marcellus's life given by Livy, Plutarch, and others, are believed to be very much colored and distorted—as Polybius, one of the best and most trustworthy authorities on the Punic war, denies that he ever defeated Hannibal at all!

MARCH, the first month of the Roman year, and the third according to our present calendar, consists of 31 days. It was considered as the first month of the year in England until the change of style in 1752, and the legal year was reckoned from Mar. 25. The Anglo-Saxons called it *Hlyd monath*, stormy month, and *Hraed monath*, rugged month. There is an old proverb, still used by the English and Scotch rustics, which represents March as borrowing three days from April; and in *The Complaynt of Scotland* they are thus described:

> The first it shall be wind and weet;
> The next it shall be snaw and sleet;
> The third it shall be sic a freeze
> Shall gar the birds stick to the trees.

But it is disputed whether these "borrowed days" are the last three of March or the first three of April.

MARCH, a musical composition, chiefly for military bands, with wind instruments, intended to accompany the marching of troops. There are slow and quick marches, also marches peculiar to different countries.

MARCH, a market t. of Cambridgeshire, England, 29 m. n. from Cambridge, on both sides of the Old Nen, which is here navigable for boats, and on the East Anglian railway. There is a junction of five railways at March. There is a large square market-place in the center of the town, and a splendid court-house, in which the meetings of the Middle level drainage commissioners are held. Pop. '71, 5,854. In the neighborhood is *March wet fen*, a drained fen with an area of 3,600 acres, from which the water is pumped off by steam-engines.

MARCH, or MORA'WA, a river in Austria, rising in Moravia, flowing s.e., and then s.w., separating Hungary from Moravia, during a part of its course, and entering the Danube 8 m. w. of Presburg. It is navigable for 50 m. from the Danube.

MARCH, ALDEN, LL.D., 1795–1869; b. Mass.; studied medicine at Boston and at Brown university, where he received a degree in 1820. He practiced surgery for many years at Albany, N. Y. He was one of the founders of the city hospital and the medical college at Albany, professor of surgery in the latter, and president of the American medical association.

MARCH, AUSIAS, d. about 1462; a Valencian poet, the date of whose birth is unknown; a disciple but not an imitator of Petrarch, and among the first poets of the 15th century. His productions are remarkable for force and delicacy, as well as for loftiness of poetic conception. The early editions of his works, published in the 16th c., are now very rare; but a more complete edition, based upon them, was published at Barcelona in 1864.

MARCH, CHARLES W., 1815–64; b. Portsmouth, N. H.; graduated at Harvard college in 1837; practiced law in Portsmouth, and was a member of the legislature. Subsequently he removed to New York, and became a writer for the *Tribune* and the *Times*, and a correspondent of the *Boston Courier*. He was also for a time vice-consul at Cairo. He published *Daniel Webster and his Contemporaries, or Reminiscences of Congress; Sketches and Adventures in Madeira, Portugal, and the Andalusias of Spain.*

MARCH, FRANCIS ANDREW, LL.D., b. Mass., 1825; graduated at Amherst college in 1845, where he was tutor 1847–49; was admitted to the bar in New York in 1850; taught school at Fredericksburg, Va., 1852–55; appointed tutor in Lafayette college 1855; adjunct professor 1856, and in 1858 professor of the English language and comparative philology; received the degree of LL.D. from the college of New Jersey in 1870, and from Amherst in 1871; elected in 1873 president of the American philological association. His contributions to the transactions of that society and of the national educational association on philological subjects have been numerous. He has written also for the *Jahrbuch für Romanische und Englische Literatur* in Berlin. To the *Princeton Review* he has contributed articles on jurisprudence and psychology. He has published *A Method of Philological Study of the English Language; Parser and Analyzer for Beginners; Anglo-Saxon Grammar; An Introduction to Anglo-Saxon; Grammar, Reader*, etc. He has also edited a series of text-books of the Greek and Latin Christian writers, of which *Latin Hymns* and *Eusebius* have been issued. His rank among American philologists is very high.

MARCHAND, JOHN B., b. Penn., 1808; entered the U. S. navy in 1828; was made lieut. in 1840, commander in 1855, capt. in 1862, and commodore in 1866. He took part in the Seminole and Mexican wars, and in the war for the union, distinguishing himself in the latter at the battle of Mobile bay, Aug. 5, 1864, where he commanded the *Lackawanna*. He retired in 1870.

MARCHAN'TIA, a genus of *hepaticæ* (q.v.), the type of a sub-order distinguished by the spore-cases bursting irregularly, and the spores being mixed with elaters, by some botanists elevated into a distinct order. Several species are natives of Britain, some of which are very common in moist shady situations, covering rocks, earth, etc., with their spreading green lichen-like fronds.

MARCHE'NA, a t. of Spain, in the province of Seville, and 33 m. e.s.e. of the city of that name, in a district rich in corn and olives. In the vicinity are sulphur baths, to which many invalids resort. Pop. 11,600.

MARCHES, the boundaries between England and Scotland, also between England and Wales. See MARK.

MARCHES, in Scotch law, mean the boundaries of property. By an ancient Scotch statute, one proprietor can compel an adjoining proprietor to join him in erecting a mutual fence, or to bear half the expense thereof. No such power exists in England or in Ireland.

MARCHES, THE, a central division of the Italian kingdom, comprising the provinces of Ancona, Ascoli-Piceno, Mascerata, Pesaro, and Urbino; 3,751 sq.m.; pop. 915,419. The district is bounded on the e. by the Adriatic sea, and on the w. and n.w. by the Apennines. It is traversed by the rivers Potenza, Foglia, and one or two smaller streams. The name is derived from the Italian *marce*. The most important city is Ancona, a sea-port on the Adriatic, 132 m. n.e. of Rome, and of very ancient origin; pop. 45,741. Great part of the country is mountainous, but not unfertile. The chief articles of export are fruit, oil, nuts, grain, and wool. Pesaro, the capital of Pesaro and Urbino, n. of Ancona, pop. 20,000, is supposed to be of Pelasgian origin, and had a bishop as early as 251 A.D. It is a sea-port town, and has a very considerable commercial trade. The cathedrals of both Pesaro and Macerata are of great interest, and the whole district is noted for its public buildings, mosaics, and works of art. An account of the separate provinces will be found under the appropriate heads.

MARCHE'SI, POMPEO, 1790–1858; b. Italy; a sculptor, the pupil of Canova, and afterwards professor in the academy of fine arts. His masterpiece is "The Celebration of Good Friday," a marble group in the church of S. Carlo in Milan, and his other most noteworthy works are statues of the emperor Francis of Beccaria, and Bellini, and the Goethe statue in the public library of Frankfort.

MARCHING, one of the first necessities to distinguish a body of disciplined troops from a mere crowd of men, is a regular cadenced step, taken by every individual at the same time and with the same foot. The necessity of this for harmonious action is obvious. The ancient Roman legions had military music to beat time for their march. In the feudal ages, when infantry fell into disrepute, cadenced marching was unattended to, and seems only to have been thoroughly revived by marshal Saxe. The best music for a march is found to be some simple tune, such as can readily be performed by drums and fifes. The music, besides preserving the time, acts as a preventative of fatigue.

In the British service there are the slow march of 75 paces, each of 30 in., in a minute —only used on parade; the quick march, of 110 paces, in which all evolutions are performed; and the double-quick, of 150 running paces, with the knees raised high. This last cannot be sustained for any great distance, and is employed in a charge, or in suddenly occupying a hill or some commanding position, and in a few short internal movements of regiments.

Countermarching is an evolution by which a body of men change front, and at the same time retain the same men in the front rank. The movement being represented by "right face, quick march, left wheel, forward, halt, front, dress." On the same principle, a whole army will sometimes change front. If after the countermarch the order "rear-face" be given, the same front will be preserved, with the rear-rank in front, and what was previously the right now serving as the left. A rear-rank may also become a front-rank by merely countermarching round the end of the latter, which remains stationary.

MARCIANI'SI, a t. of the Italian province of Caserta (Terra di Lavoro), situated 13 m. n. of Naples, in a low unhealthy plain, in the midst of several lakes. Pop. '72, 9,499.

MARCION, the founder of the Marcionites, an extremely ascetic Gnostic sect, was the son of a bishop of Sinope in Pontus. In his earlier years he was a sailor or ship-master. Being excommunicated by his father, on account of his heretical opinions, he went to Rome about 140 A.D. He made several anxious efforts to obtain a reconciliation with the Catholic church, for he does not appear to have loved schism; but his restless, prying, theorizing intellect constantly led him into opinions and practices too hostile to those of his fellow-Christians to permit of their being passed over in silence. After his final excommunication, he associated himself with the Syrian Gnostic Cerdon, and founded a system, in some respects, quite antagonistic to Christianity. The gospel of Christ, according to him, consisted in free love of the good; the Mosaic system, with its motives of rewards and punishments, was mere legality; and there is as irreconcilable an opposition between the respective authors of the "Law" and the "Gospel," i.e., the Creator, on the one hand, and the God of the Christians, on the other, as there is between these two works. His system is but imperfectly known; and it is supposed to have assumed

either three or four aboriginal beings—Good, Evil, Creator, and Matter. See GNOSTICS. Respecting the outward form of worship practiced among his followers, little is known save that it had great similarity—as had their whole religious system—to that of the Manichæans (q.v.). Marcion entirely rejected the Old Testament; and of the New Testament all but a few epistles and the gospel of St. Luke, which had also to undergo certain changes from his hand. The first four chapters were omitted, and the fifth he began with the words: "In the 15th year of the reign of Tiberius Cæsar, God came to Capernaum, a city of Galilee, and spoke on the Sabbath." The Marcionites subsisted as a distinct party till the 6th c., and were diffused through Syria, Egypt, Palestine, etc. Tertullian and others wrote against them.

MARCOMAN'NI, an ancient German people who, in the time of Cæsar, lived along the banks of the Rhine, but afterwards, as appears from Tacitus and Strabo, settled in Bohemia, from which they expelled the Boii. Their king, Maroboduus, entered into an alliance with the tribes living around them to defend Germany against the Romans. The combined forces of the alliance numbered 70,000 men, and the emperor Tiberius signed a treaty with them in 6 A.D.; but the Marcomannic alliance was beaten 11 years later by the Cherusci and their allies, and in 19 the Gothic Catualda drove Maroboduus from the throne, and himself usurped the sovereignty. But he was soon overthrown, and the native dynasty established, under whose rule the Marcomanni extended their territory up to the Danube, till their encroachments alarmed the Romans, who attacked them in the time of Domitian. This war, which subsided for a time in the reigns of Trajan and Hadrian, broke out again under Marcus Aurelius, and was carried on with bitterness from 166 to 180, when it was ended by the peace of Commodus. The Marcomanni continued to make raids into the provinces of Noricum and Rhætia, and in 270 invaded Italy as far as Ancona. From this time they are little heard of; and their identity finally disappears among the followers of Attila.

MARCO POLO. See POLO, *ante*.

MARCOU, JULES, b. in Salins, France, 1824; educated in Paris. He was companion and pupil of Germain, Thurmain, and Agassiz in their studies in the Alps in 1844–46; and in the latter year published his *Recherches Géologique sur le Jura Salinois*. In 1847 he had charge of the classification paleontological of the museum. In 1849 he visited the United States and made geological explorations with Agassiz and others. In 1853–54 he was employed by the United States government in geological surveys in the Rocky mountains and California. In 1855 he became professor of geology at Zurich. In 1860 he returned to the United States to study fossiliferous formations. His works are numerous. Those on the geology of the Jura mountains were his first and last; while of treatises on the geology of the United States and Canada, and especially of the geologic peculiarities of the Rocky mountains and California, his are among the highest French authorities.

MARCUS THE HERESIARCH, a Gnostic philosopher of the 2d century. Neander thinks he was born in Palestine; Jerome, that he was an Egyptian. Irenæus and others of the fathers say that he was very licentious. Neander in his Church history has the following account of him: "Marcus set forth his system in a poem, in which he introduced the divine Æons discoursing in liturgical forms, and with gorgeous symbols of worship. After the fashion of the Jewish cabala, he discovered special mysteries in the numbers and positions of letters. The idea of a *logos tou ontos*, of a 'word' manifesting the hidden divine essence in the creation, was spread out by him into the most subtle details; the entire creation being in his view a continuous *utterance* of the ineffable."

MARCUS AURELIUS. See ANTONINUS, *ante*.

MARCY, MOUNT, one of the Adirondack mountains, in Keene, Essex co., N. Y., 5,467 ft. high. It was known to the Indians as *Tahawus*, the "cloud-divider."

MARCY, ERASTUS E., b. at Greenwich, Mass., Dec. 9, 1815; graduated at Amherst in 1837, and at the Jefferson medical college in Philadelphia in 1840. He began the practice of medicine as an allopathist, but after a few years adopted the homeopathic doctrines, and settled in New York, where he met with great success. He wrote extensively on medical and chemical subjects, edited for many years the *Homeopathic Journal;* published *The Theory and Practice of Medicine*, and *Homeopathy vs. Allopathy*, which were translated into foreign languages and republished in Europe. He also edited Hahnemann's *Lesser Writings*.

MARCY, RANDOLPH B., b. Mass., about 1811; graduated at West Point in 1832, and was appointed lieut. 2d infantry in 1837; served in the war with Mexico, and was promoted to a captaincy; upon the conclusion of that war, was successively engaged in explorations in the Red river country, in operations against the Seminoles, and in the Utah expedition of 1857–58; was appointed paymaster, with the rank of major, in 1859, and inspector-gen., with the rank of col., in 1861; was chief of staff to gen. McClellan (his son-in-law) in West Virginia, on the peninsula, and in Maryland; and was made brig.gen. of volunteers Sept. 23, 1861. He has published *Exploration of the Red River; The Prairie Traveler;* and *Personal Recollections*. His residence is on Orange mountain, N. J.

MARCY, WILLIAM LEARNED, 1786–1857; b. Southbridge, Mass. In 1808, after graduating from Brown university, he taught school for a short time, but soon entered upon the practice of law at Troy, N. Y. At the opening of the war of 1812 he entered the volunteer service as a lieut., and Oct. 22, 1812, led the attack upon St. Regis, a Canadian post, stormed the block-house, and captured the first flag and prisoners taken on land in the war. At the close of the war he returned to Troy, where he was for some time editor of the *Budget*, an anti-federalist daily paper. After filling several minor offices, he was made an associate-justice of the New York supreme court in 1829; in 1831 he was elected senator of the United States by the democratic party, but resigned the office upon being chosen governor of New York in 1832 This position he held for three terms, but in 1838 was defeated by William H. Seward. He was appointed a commissioner on Mexican claims in the same year, and served in that capacity until 1842. In 1845 he became the secretary of war in Polk's cabinet. His ability in this position was severely tested by the Mexican war, and it was generally acknowledged that in the conduct of that conflict he displayed much energy and diplomatic adroitness. The last and most important public station in which he served was that of secretary of state in Pierce's administration, 1853–57. Among the foreign complications or treaties which demanded his action in this capacity were the Oregon question, the acquisition of Arizona and settling of the Mexican boundary, the Canadian reciprocity treaty, commodore Perry's negotiations with Japan, the British fishery dispute, and the Ostend conference. In nearly all of these and other questions Marcy successfully defended the interests of his country; and in all he displayed the qualities of a trained statesman and accomplished diplomat. The most notable of his diplomatic correspondence was the series of letters in the case of Martin Koszta, a Hungarian, who, after declaring in New York his intention of becoming an American citizen, was detained by the Austrian power at Smyrna, and released by capt. Ingraham (q.v.) of the U. S. navy. Mr. Marcy's death occurred but a few months after the expiration of his term of office, at Ballston Spa, N. Y.

MARDI GRAS (literally fat Tuesday), the French designation for what is known as Shrove Tuesday in the calendar of the English church, the festival held upon the Tuesday preceding Ash Wednesday, the first day of Lent; with the exception of Mi-Carême or mid-Lent Thursday, the last of the prolonged festivities known as the carnival. It is most extensively celebrated in Rome and Paris. In the latter it has been the custom for many centuries to lead in procession a fat or prize ox (*bœuf gras*, whence *Mardi gras*), followed in a triumphal car by a child called the butchers' king. The entire day and night is spent in the wildest revelry, sometimes degenerating into unrestrained license. In the United States the only celebration of Mardi gras worthy of note is that of New Orleans, where the first display was given in 1857, and since the end of the war the observance has been carried out with great pomp and splendor. For the preceding week the gayety has been universal, and on Mardi gras the whole city is turned over to the rule of king Rex, who enters the gates on the previous day. On Tuesday the mimic monarch passes through the streets, escorted by his body-guard, the "mystic krewe of Comus," knights of Momus, and various military and visiting organizations. To him are confided the gates of the city; minor police regulations are suspended, and until the dawn of Ash Wednesday the air is filled with music; in every street are dense throngs of merry-makers, and the glare of illuminations. In the evening occurs the great street pageant of the mystic krewe of Comus, in which are displayed elaborate tableaux, placed on moving platforms and brilliantly illuminated. These represent noted scenes of history, poetry, or fiction, and are constructed at great expense and with artistic elegance. All the arrangements of the parades and accompanying balls are under the control of societies composed of the most noted professional and business men of the city. The observance is gaining ground also in Memphis, Tenn.

MARDIN', a considerable t. of Asiatic Turkey, is strikingly situated, at an elevation of 2,300 ft., on the southern slopes of the Mardin hills (anciently Mt. Masius), 57 m. s.e. of Diarbekir. It contains numerous mosques, bazaars, and baths, and the ruins of an old castle. The ornaments in arabesque on the gates of the citadel are said to be finer than those of the Alhambra. Pop. about 15,000, of whom the half are Moslem Kurds, and the other half Chaldeans, Maronites, and Jacobites (q.v.), and who carry on manufactures of linen and cotton fabrics, and of leather. During the decline of the caliphate of Bagdad, Mardin rose to considerable importance, and was for a long time the capital of a principality under a branch of the Ayubites (descendants of Salah-ed-din), but its short-lived glory was soon after quenched by the advancing tide of the Mongols. It was subsequently taken by Timur.

MAREE', LOCH. in the w. of Ross-shire, Scotland, is 18 m. in length, with a breadth varying from 1 to 3 m., and a depth, in some places, of 60 fathoms. Owing to its great depth, it never freezes over its whole extent. It is surrounded by mountain-scenery which, for wildness and grandeur, is not excelled in Scotland. Its waters are carried off to the sea by the river Ewe, 2 m. in length. The loch contains numerous islets, one of which contains the remains of an ancient chapel, with a grave-yard.

MARE ISLAND, in Solano co., Cal., off the bay of S. Pablo. It has a U. S. navy-yard, an arsenal, and a floating dock.

MAREM'MA (corrupted from Marittima, *situated on the sea*), a vast marshy region of w. Italy, extending along the sea-coast of Tuscany, from the mouth of the Cecina to Orbitello, and embracing an area of 997 sq. miles. The Pontine marshes and the Campagna of Rome are similar districts. Formerly, these maremme were fruitful and populous plains; but neglect of the water-courses of the district allowed the formation of marshes; and now they have become generators of tertiary fevers, and present an aspect of dreary desolation in the summer months, when the inhabitants flee from their miasmata, prejudicial alike to man and beast. Leopold II., the late grand duke of Tuscany, directed especial attention to the drainage and amelioration of the Tuscan maremme, and considerable success attended their being largely planted, trees being a corrective of their malarious effects. From 1828 to 1848 the cost of the drainage of the maremma was £531,000. The arable land in the vicinity of the maremma is exuberantly fertile; but the harvests are gathered by hired laborers in the most infected districts, and in their emaciated and livid features may be seen the fatal action of malaria. During winter the maremma is inhabitable, and yields good pasture.

MAREN'CO, CARLO, 1800–43; b. Piedmont; studied law at Turin, where he graduated in 1818. He soon turned his attention to literature, and won a considerable reputation in 1828 by a drama called *Bondelmonte*. His posthumous works were published at Florence in 1856, as *Tragedie Inedite*. His most popular work, perhaps, is *La Famiglia Foscari*.

MARENGO, a co. of w. Alabama, traversed by the Arkansas Midland railroad, and drained by the Tombigbee and Black Warrior rivers, the first forming the w. boundary; 975 sq.m.; pop. '70, 26,151—20,058 colored. The soil is extremely fertile, the staples being cotton, Indian corn, and sweet-potatoes; of cotton, 23,614 bales were raised in 1870; and of Indian corn, nearly 600,000 bushels. Butter is also a staple, and the county is well stocked with horses, cattle, and swine. Chief town, Linden.

MAREN'GO, a village of northern Italy, in the province of Alessandria, situated near the Bormida, in the midst of extensive forests. Marengo was the scene of a memorable battle, in which a French army, commanded by Bonaparte, and numbering somewhat more than 20,000, defeated and routed 32,000 Austrians, under gen. Melas, on June 14, 1800.

MARENHOLZ-BULOW (BERTHA VON BULOW), Baroness, for many years an advocate and expounder of the principles of the kindergartner system of education for young children. She was intimately acquainted with Frederick Froebel, the founder of the system, obtained a thorough knowledge of it from him, and introduced the schools in nearly all the countries of Europe, and in England. In Berlin she sustained a normal school for three years, where teachers of kindergartens were educated, and has since been lecturer in the Dresden college of the same kind. She has printed several pamphlets and lectures on the subject, such as *The Kindergarten* and *The Child and its Being*.

MAREO'TIS, or **MAREIA**, LAKE, the modern *Birket-el-Mariût*, a salt lake or marsh in the n. of Egypt, extends southward from the city of Alexandria, and is separated from the Mediterranean, on its n.w. side, by a narrow isthmus of sand. In ancient times its length was about 42 m., its breadth about 22. Its shores were planted with olives and vines, and the papyrus, which grew upon its banks and on its eight islets, was famous for its fine quality. In more recent times, the canals which fed lake Mareotis were neglected, and its depth and area were much reduced. In the 18th c. the bed had become, in great part, a sandy waste; but in 1801, during the war between the English and French, the sea was let in by the former, and it is now again a marshy lake. The passage by which the sea found entrance was subsequently closed up by Mehemed Ali. The present dimensions of the lake are about 27 m. long by 25 m. broad.

MARESCH, J. A., 1709–94; a Bohemian by birth; but the greater part of his life was spent in the Russian service. He was a musician and made great improvements in the construction of the Russian horn, an unbent brass tube of conical shape. In 1755 he gave an exhibition before the imperial court, when a band of 37 men, furnished with horns varying from 7 feet to 1 foot in length, produced concerted pieces, each being carefully drilled to sound his own instrument at precisely the proper instant. For the skill and dexterity displayed in this rather ludicrous performance Maresch was richly rewarded by the empress Elizabeth.

MARET, HENRI LOUIS CHARLES, b. France, 1804. As a priest of the seminary of Sulpice, Paris, he distinguished himself in 1869 by joining a group of French bishops and theologians who pronounced squarely against the dogma of the infallibility of the pope, then just proclaimed officially from Rome. He wrote *Du Concile général*, a book which showed the absurdity of the claim from a standpoint within the church. This brought down upon him the anathemas of the pope's party and its organs, though the archbishops of Paris, Orleans, and Bésançon were quite of the same opinion as Maret. But in 1871 Maret made a complete surrender, and declared to the pope that he "regretted everything which he had said in that work." He has been a large contributor to Roman Catholic reviews since 1836. His works on the relations of religion and philosophy are numerous.

MARET, HUGUES BERNARD. See BASSANO, *ante*.

MAREY, ÉTIENNE JULES, b. at Beaune, France, 1830; educated as a physician. In 1850 he went to Paris; in 1860 opened a school of experimental physiology and gave a free course of instruction the following year on the circulation of the blood and the diagnosis of the diseases of the heart and its vessels. In 1864 he founded a laboratory of physiology in the *rue de l'Ancienne Comédie* in Paris; in 1867 succeeded Flourens as assistant professor of natural history in the college of France; and subsequently has filled many positions of honor in Paris and elsewhere. The study of animal heat, of muscular and nervous action in connection with the movements of the heart, electrical phenomena, and the study of the effects of various poisons have been his specialties. His works are mostly contributions to medical magazines and reviews, and he has published the following volumes: *Recherches sur la Circulation du Sang à l'état sain et dans les Maladies*, 1859, 4to; *Physiologie Medicale de la Circulation du Sang*, 1863, 8vo; *Études Physiologiques sur les Caractéri e graphique des Battement du Cœur, et des Mouvements Respiratoires*, 1865, 8vo; *Du Mouvement dans les Fonctions de la Vie*, 1867, 8vo; etc.

MARFO'RI, CARLOS, b. Italy, 1820; entered the Spanish civil service, and became a favorite of queen Isabella. He was an intimate friend of Narvaez, who originally introduced him to favor, and when Narvaez took office in 1866, Marfori became governor of Madrid and chief of the royal household. He was an object of hatred to the people, but remained in high favor with the queen, who refused to dismiss him, and, since the revolution by which she lost the crown, he has continued to be the chief of her household.

MARGARET, sometimes called the "Northern Semiramis," queen of the triple Scandinavian kingdom of Denmark, Norway, and Sweden, was the second daughter of Valdemar III., king of Denmark, and wife of Hakon VIII., king of Norway. Margaret was born in 1353, and on the death of her father, without direct male heirs, in 1375, the Danish nobles, passing over the son of Valdemar's eldest daughter, Ingeborg of Mecklenburg, offered the crown to Margaret and her husband in trust for their infant son Olaf. By the death of Hakon in 1380, Margaret became sole guardian of the young prince, who died at the age of 17 in 1387; and such was the discretion with which she had conducted the government during her sole regency, that the estates of both kingdoms concurred in electing her as their joint sovereign ruler. Having received the crown at their hands, she convoked a *landthing*, in which she announced that, with the concurrence of her subjects, she would nominate her grand-nephew, Eric of Pomerania, as her successor; and although, owing to Eric's infancy at the time, and his subsequent incapacity, the real power rested in the hands of Margaret, she contented herself from that time with the title of "Margaret, by the grace of God, daughter of Valdemar, king of Denmark." At the moment that Margaret was cementing the union of Norway and Denmark, the condition of affairs in Sweden opened the way for a further extension of her power; for the Swedish king, Albert of Mecklenburg, had so thoroughly alienated the affections of his subjects, that the nobles, declaring the throne vacant, offered to acknowledge Margaret as their ruler. The queen lost no time in sending an army into Sweden to support her pretensions, and defeated the king's German troops at Leaby, where Albert and his son Eric fell into her hands. Albert remained in prison seven years, during which time Margaret succeeded in wholly subjugating Sweden; and in 1397 she made her triumphal entry into Stockholm, with her nephew Eric, who shortly afterwards was, in his 16th year, crowned king of the three Scandinavian kingdoms. On this occasion, Margaret brought forward the memorable act of union, which she had drawn up with her own hand, and to which were appended the signatures of seventeen of the principal men in the three kingdoms. By this remarkable act, known as the union of Calmar, from the place at which it was signed and first promulgated, it was stipulated that the three kingdoms should remain forever at peace under one king, retaining their own laws and customs; and that, at the death of the sovereign, if he left several sons, one of their number should be chosen by the combined estates of the three realms, who were also to elect a new king in the event of the deceased monarch having died childless. This utopian scheme utterly broke down at the death of Margaret, which took place in 1412.

MARGARET (MARIE MARGUERITE THÉRÈSE JEANNE DE SAVOIE), queen of Italy, b. 1851; daughter of Ferdinand, prince of Savoy; was married April 22, 1868, to Humbert, hereditary prince of Savoy, prince royal, and prince of Piedmont. The latter succeeded his father, Victor Emmanuel I., as king of Italy, Jan. 9, 1878, and Margaret ascended the throne with him as queen of Italy. She is amiable, cultivated, and the idol of her people. With a cultured taste and exquisite tact, she has a rare sweetness of disposition, and is almost idolized by the Italian people.

MARGARET OF ANGOULÊME. See MARGUERITE DE VALOIS, *ante*.

MARGARET OF ANJOU, wife of Henry VI. of England, and daughter of René of Anjou, the titular king of Sicily, and of Isabella of Lorraine, was b. at Pont-à-Mousson, in Lorraine, Mar., 1425. She was married to Henry VI. of England in 1445; and her husband being a person of very weak character, she exercised an almost unlimited authority over him, and was the virtual sovereign of the realm; but a secret contract at her marriage, by which Maine and Anjou were relinquished to the French, excited

great dissatisfaction in England. The strife between the English and French, which lost to the former the whole of their possessions in France except Calais, was charged upon Margaret. In 1450 occurred the insurrection of Jack Cade, and soon after the country was plunged in the horrors of that bloody civil war known as the *Wars of the Roses* (q.v.). After a struggle of nearly 20 years, Margaret was defeated and taken prisoner at Tewkesbury, and imprisoned in the Tower, where she remained five years, till Louis XI. redeemed her for 50,000 crowns. She then retired to France, and died at the château of Dampierre, near Saumur, in Anjou, Aug. 25, 1482.

MARGARET OF AUSTRIA, 1440–1530; b. in Brussels; daughter of Maximilian I., emperor of Austria, and of Mary of Burgundy; remarkable for her domestic misfortunes, and her wisdom as ruler and in diplomacy. While an infant she was by the treaty of Arras affianced to the dauphin of France, afterwards Charles VIII., but the contract was not filled. In 1495, by a treaty with Ferdinand and Isabella of Spain, she was again engaged to prince John of the Asturias, heir to the Spanish throne. On her way to Spain to marry him, in the midst of a storm at sea, supposing they would be wrecked, she had the amiable pleasantry to write her own epitaph in these words:

Ci-git Margot, la gente demoiselle,
Qu'eut deux maris, et si morut pucelle.

But she married prince John nevertheless in 1497. He died the same year and she returned in 1499 to the Netherlands. In 1501 she married Philibert, duke of Savoy, who died without issue in 1504, after a happy married life with her. On the death of her brother Philip in 1506 her father the emperor made her regent of the Netherlands, and gave her charge of the education of her nephew, the future Charles V. of Germany, and his sister Mary. She assumed the government, exhibited administrative talent of a high order; assisted as plenipotentiary in the conference of Cambrai in 1508, and concluded the treaty with cardinal Amboise; brought the king of England to league against France in 1515; and negotiated with Louise of Savoy the peace of 1529, called the *Paix des Dames*. These were but the more showy events of her government. Her real title to most honorable mention in history is derived from the wisdom of the peaceful measures of her government, which brought the agriculture, the commerce, and the arts of the Netherlands to a high degree of prosperity. Margaret was the author of numerous unpublished poetical effusions. Her *Correspondence avec son Pere* was published in Paris in 1839 in two 8vo volumes.

MARGARET OF AUSTRIA, Duchess of Parma, Regent of the Netherlands; 1522–86; b. in Brussels; daughter of Charles V. without marriage by Marguerite van Gest of the Netherlands. In 1535 she married Alexander, duke of Florence, who died in 1537; and in 1538 married Octave Farnese, who became duke of Parma and of Plaisance. She was appointed by Philip II. in 1559 to govern the Netherlands, and followed the system of her great predecessor of the same name in softening the asperities of conflicting parties in the government, and moderating the execution of the terrible religious edicts of Philip II. The latter refusing to modify his persecutions under the inquisition, an insurrection broke out in 1566. While she manifested great energy in repressing it, she did all in her power to prevent the cruelties of Spanish religious intolerance towards those who took part in it. But no sooner was order re-established than Philip II. sent the duke of Alva with full power to complete the work in the spirit of the inquisition, and placed in his hands the powers with which she had been invested. She left the country to become the butchering-ground of religious persecution, and rejoined her husband in Italy, where she passed the remainder of her life. She was of masculine temperament, loved the chase, was a natural politician, gifted with a supple sagacity that suited itself to the occasion, and with views of statesmanship several centuries in advance of those of Spanish rulers.

MARGARET, SAINT, Queen of Malcolm Canmore (q.v.).

MARGA'RIC ACID ($C_{34}H_{33}O_3$. HO) is one of the solid fatty acids. At an ordinary temperature it is solid, white, and crystalline; it is perfectly insoluble in water, dissolves in boiling alcohol, from which it separates in glistening groups of very delicate needles, and is readily soluble in ether. It unites with bases, forming margarates, and in combination with glycerine (q.v.) forms the glyceride or fat known as *margarine*.

This acid occurs either in a free state or in combination with alkalies in most of the animal fluids, with the exception of the urine, and as a glyceride it is widely diffused in the animal and vegetable fats. Heintz maintains that this acid is merely a mixture of about ten parts of palmitic acid (q.v.) with one part of stearic acid (q.v.). Margarine constitutes the solid ingredient in human fat, butter, goose grease, olive oil, etc.

MARGARI'TA, or NUEVA SPARTA, an island in the Caribbean sea, belonging to Venezuela. Area, 440 sq.m.; pop. 21,000. Discovered by Columbus in 1498, Margarita was long famous for its pearl-fisheries.

MAR'GARITE, or PEARL MICA, called also corundellite, clingmanite, and pearl-glimmer, one of the hydrous silicates, belonging to the chlorite section. It crystallizes in the trimetric system, usually in intersecting or aggregated laminæ; sometimes massive with scaly fracture. Analysis by J. Lawrence Smith of a specimen from the island of Naxos gave: silica, 30.02; alumina, 49.52; peroxide of iron, 1.65; lime, 10.82; magnesia,

0.48; potash and soda, 1.25; water, 5.55 per cent. The mineral occurs in chlorite rocks at Sterzing in the Tyrol; associated with emery in Asia Minor and in the Grecian archipelago, as discovered by Dr. Smith; with corundum at Village Green, Delaware co., Penn.; at Unionville, Chester co., Penn.; with corundum in Buncombe co., N. C.; and at Katherinenburg in the Ural mountains. A variety called *diphanite* contains protoxide of manganese, associated with iron.

MARGARITONE D'AREZZO, 1212–89; b. Arezzo, Italy. He executed many pictures both in fresco and distemper. Of the former, on wood and on copper, the most celebrated specimens were in the church of San Clemente, and a work executed for the nuns of Santa Margarita. But that which Vasari calls one of his masterpieces, "on which he placed his name," was a "San Francesco," painted for the convent of the friars de' Zoccoli at Sargiano, which still exists, with his own inscription, *Margrit. de Aretio pingebat.* He is said to have excelled more as a sculptor than as a painter. His masterpiece of art was a reclining statue in marble of pope Gregory X. in the cathedral of Arezzo, which is still in good preservation.

MARGATE, a municipal borough, seaport, and famous watering-place of England, in the isle of Thanet, Kent, about 70 m. e.s.e of London. All the usual resources of a watering-place—theater, baths, libraries, assembly room, etc.—are found here; and a fine pier, which is the principal promenade. The shore, covered with a fine and firm sand, is well adapted for sea-bathing. Fishing is carried on to a considerable extent. A deaf and dumb asylum was opened in 1875. A fluctuating population of between 50,000 and 100,000 is poured into the town during the season. Pop. '71, 11,995.

MARGAY, *Felis tigrina,* a species of cat or tiger-cat; a native of the forests of Brazil and Guiana; about the same size with the wildcat of Europe; of a pale fawn color, with black bands on the fore-parts, and leopard-like spots on the hind-parts, and on the rather long thick bushy tail. It has been erroneously represented as untamable, being, in fact, capable of a complete domestication, and of being made very useful in rat-killing.

MARGINAL CREDITS, the name given to business operations, in which bankers lend the credit of their names, as it were, to their customers, and thus enable them to carry out important commercial transactions which otherwise could not be gone into, or only at excessive cost. A merchant in this country, for instance, desires to import tea or silk, but his name is not so well known on the Chinese exchanges, that bills drawn upon him by a merchant in China can be sold there at a reasonable rate of exchange. The tea or silk cannot be bought without the money being on the spot to buy it with, and if he sends out specie for that purpose he involves himself in heavy charges for freight and insurance, and loses the interest of his money while on the voyage. Before it arrives, the prices of tea and silk may have been so altered in the market that he would not be inclined to buy, and his money would thus be placed where it is not wanted. But while drafts by the merchant in China on the merchant in this country would not sell, or only at a heavy sacrifice, the drafts by the merchant in China on a banker in this country will sell at the best price. The merchant in this country therefore deposits with his banker, cash or securities equal to the amount to which he desires to use the banker's name, and receives from him *marginal credits* for the amount. These are bill-forms drawn upon the banker, but neither dated nor signed, with a margin containing an obligation by him to accept the bills when presented. The bills are dated, drawn, and indorsed by the merchant in China before being sold, so that the obligation runs from the date on which the money was actually paid, and the tea or silk is most likely in the merchant's warehouse before the bill is payable. For the transaction, the banker charges the merchant a commission to remunerate himself for the risk involved.

Many other transactions between merchants abroad and in this country can only be carried through by the acceptances of a London banker being tendered in payment, but the transactions are intrinsically the same as when marginal credits are used. The banker in the country can arrange with his customer to obtain the London banker's credit for him. Bankers—usually in London—also accept bills to a great amount for the exchange operations of foreign banks. A banker in, say Canton, buys from his customers bills drawn upon merchants in this country for a given amount, and sends them to his correspondent in London, who holds them for him and grants a credit in his favor on the security of them. The Canton banker operates upon this credit by drawing upon the London banker, and sells his drafts at the most favorable exchange. With the money received he purchases other bills, and remits them also, to be again drawn against. When these operations are made with caution and sound judgment, they are beneficial to all concerned; but when engaged in without sufficient knowledge or recklessly, they involve most disastrous consequences.

MARGRAVE. See MARQUIS, *ante.*

MARGUERITE DE VALOIS, in her youth known as Marguerite d'Angoulême sister of Francis I. of France, and daughter of Charles of Orleans, comte d'Angoulême, was b. at Angoulême, April 11, 1492. She received a brilliant, and even a profound education, but was characterized by the most charming vivacity. In 1509 she was married to Charles duke of Alençon, who died in 1525. In 1527 she was married to Henry d'Albret king of Navarre, to whom she bore a daughter, Jeanne d'Albret, mother of

the great French monarch, Henri IV. She encouraged agriculture, the arts, and learning, and to a certain extent embraced the cause of the reformation. Later, she found it necessary to be prudent, and even to return to the practices of the Roman Catholic church. But she never ceased to act with a courageous generosity towards the reformers, who always found an asylum and welcome in Navarre. She wrote a little religious work *Miroir de l'âme pécheresse*, which was condemned by the Sorbonne, as favoring Protestant doctrines. She also wrote poems and tales, and a *Heptaméron des Nouvelles* (Par. 1559), modeled on the *Decameron* of Boccaccio. Marguerite died Dec. 21, 1549.

MARHEINEKE, PHILIPP KONRAD, 1780–1846, b. Germany, educated at Göttingen, and in 1806 appointed professor extraordinary of theology at Göttingen. In 1809 he was made ordinary professor of theology at Heidelberg; and in 1811 called to the same position at Berlin, and chosen pastor of the church of the Trinity there, where he became a colleague of Schleiermacher. His studies lay principally in the direction of Christian symbolism and dogmatics. To the former he devoted his *Christliche Symbolik* (1810–14), and his *Institutiones Symbolicæ* (1830); to the latter, his *Grundlehren der Christlichen Dogmatik* (1819). The first edition of the latter work is based upon Schelling's philosophy; the second was revised in accordance with the philosophy of Hegel, of whom Marheineke was a follower, though he belonged to that small school of Hegelians who maintained that Hegel's philosophy was in accord with Christianity. His method of treatment is historical rather than dogmatic. His position was entirely independent, and he cannot be fairly classed as a Lutheran, a supernaturalist, or a rationalist. To the mystics he was strongly opposed. The positive form of his theology may be found in his *Entwurf der Praktischen Theologie* (1837). He wrote many books besides those named, and was one of the editors of Hegel's collected works.

MARIA CHRISTINA, queen of Spain, b. April 27, 1806, was a daughter of Francis I., king of the two Sicilies. In 1829 she became the fourth wife of Ferdinand VII. of Spain; who in 1830 restored the law by which, in default of male issue, the right of inheritance was given to females, and in October of that year the queen gave birth to a daughter, Isabella II., ex-queen of Spain. The Spanish liberals gladly embraced the cause of the queen, rejoicing to see the dreaded Don Carlos, Ferdinand's brother, further removed from probable succession to the throne. Ferdinand died Sept. 29, 1833, and by his testament his widow was appointed guardian of her children—the young queen Isabella and the infanta Maria Louisa, now duchess de Montpensier—and also regent, till the young queen should attain the age of 18 years. A civil war broke out, the adherents of Don Carlos seeking to place him on the throne. The event of this war, which continued till 1840, was long doubtful, and Spain was fearfully desolated by contending armies; but the queen-mother seemed indifferent to everything except the company of don Fernando Muñoz, one of the royal body-guard, whom she made her chamberlain, and with whom she was united, in December, 1833, in a morganatic marriage, which, however, was kept secret, whilst her connection with him was no secret. She had 10 children by him. A conspiracy, which broke out on the night of Aug. 13, 1836, exposed Muñoz to great danger, and led the queen-mother to concede a constitution to Spain. Her practice as regent was to adopt the course agreeable to the minister of the day, and thus her government was despotic under one ministry and liberal under another. She contrived, however, upon many occasions to embarrass the proceedings of her more liberal or constitutional ministers; but when she sanctioned by her signature the law respecting the Ayuntamientos (q.v.), a popular commotion ensued, and she gave to the new prime minister Espartero (q.v.), Oct. 10, 1840, a renunciation of the regency, and retired to France, but continued to interfere from her retirement in the affairs of Spain. After the fall of Espartero she returned to Madrid in 1843, and in October, 1844, her marriage with Muñoz, who was now made duke of Rianzares, was solemnized. Her participations in the schemes of Louis Philippe as to the marriage of her daughters, in 1846, and the continual exercise of all her influence in a manner unfavorable to constitutional liberty, made her the object of great dislike to the whole liberal party in Spain. At length, in July, 1854, a revolution expelled her from the country, and she again took refuge in France, but returned to Spain in 1864, only to retire again in 1868. She died August, 1878.

MARIA LOUISA, the second wife of the emperor Napoleon I., b. March 12, 1791, was the daughter of the emperor Francis I. of Austria. She was married to Napoleon, after his divorce of Josephine, April 2, 1810. The marriage seemed to give stability to the Bonaparte dynasty, and in some measure to afford a prospect of peace to Europe. On Mar. 20, 1811, she bore a son, who was called king of Rome. At the beginning of the campaign of 1813 Napoleon appointed her regent in his absence, but under many limitations. On the abdication of Napoleon, she went to Orleans, and thence, in company with prince Esterhazy, to Rambouillet. She was not permitted to follow her husband, but went with her son to Schönbrunn, where she remained till, in 1816, she received the duchies of Parma, Placenza, and Guastalla, on the government of which she then entered. She contracted a morganatic marriage with count von Neipperg. She died at Vienna, Dec. 18, 1847.

MARIANA, JUAN, a distinguished Spanish historian and scholar, was b. at Talavera in 1537, and in 1554 entered the then rising order of the Jesuits. His early studies, both

in languages and theology, were so brilliant that he was appointed to teach in the schools of his order, first at Rome (where the celebrated Bellarmine was one of his scholars) in 1561, afterwards in Sicily in 1565, and finally in Paris in 1569. After a residence there of seven years his health became so much impaired that he was compelled to return to his native country, and settled at Toledo, where he resided till his death, at an extreme old age, in 1624. His retirement, however, was not inconsistent with the most energetic and sustained literary activity. From an early period he devoted himself to a history of Spain, of which he published 20 books in 1592, and 10 additional books, carrying the narrative down to 1516, in 1605. The original of this history was Latin, the elegance and purity of which have secured for Mariana a place among the most distinguished of modern Latinists. Its great historical merit is also admitted, although with some drawbacks, even by Bayle. Mariana himself published a Spanish translation, which still remains one of the classics of the language. Among his other productions are a volume published at Cologne in 1609, consisting of seven treatises on various subjects; scholia on the Bible, which, although written at the age of 83, display a degree of vigor as of learning which might provoke the admiration of modern biblical students; an edition of the works of Isidore of Seville, with notes and dissertations; and several similar works. But the most celebrated of the works of Mariana is his well-known treatise, *De Rege et Regis Institutione*, which appeared in 1599, and in which is raised the important question whether it be lawful to overthrow a tyrant. Mariana decides that it is—even where the tyrant is not a usurper but a lawful king. See JESUITS. The principles of the book, in other particulars, are in the main the same as those of all modern constitutional writers. The tyrannicide doctrines of this writer drew much odium upon the entire order of Jesuits; but it is only just to observe that while, upon the one hand, precisely the same doctrines were taught in almost the same words by several of the Protestant contemporaries of Mariana (see Hallam's *Literary History*, iii. 130–140); on the other, Mariana's book itself was formally condemned by the general Acquaviva, and the doctrine forbidden to be taught by members of the order.

MARIANNA, or MARIANA, an episcopal city of Brazil, in the province of Minas-Geraes, about 12 m. e. of Ouro Preto. In the neighborhood are gold, silver, and lead mines. Pop. 8,000.

MARIANNE ISLES. See LADRONES, *ante*.

MARIAS, LAS TRES, three islands in the n. Pacific ocean, on the w. coast of Mexico, belonging to the state of Jalisco. They extend from n.w. to s.e. The largest is 15 m. in length and 8 in breadth; the next is 24 m. and the smallest 8 m. in circuit. They are all barren and uninhabited, but abound in wood, water, salt, and game, and were formerly visited by English and American whalers. Diego de Mendoza, who visited them in 1532, named them Isles de la Magdalena.

MARIA THERESA, Empress of Germany, the daughter of the emperor Karl VI., was b. at Vienna, May 13, 1717. By the pragmatic sanction (q.v.) her father appointed her heir to his hereditary thrones. In 1736 she married Francis Stephen, grand duke of Tuscany, to whom she gave an equal share in the government when she became queen of Hungary and of Bohemia, and archduchess of Austria, on the death of her father, Oct. 21, 1740. She found the monarchy exhausted, the finances embarrassed, the people discontented, and the army weak; whilst Prussia, Bavaria, Saxony, Naples, and Sardinia, stirred up by France, put forward claims to portions of her dominions, chiefly founded on the extinction of the male line of the house of Hapsburg. Frederick II. of Prussia soon made himself master of Silesia; Spain and Naples laid hands on the Austrian dominions in Italy; and the French, Bavarians, and Saxons conquered some of the hereditary Austrian territories. The young queen was in the utmost danger of losing all her possessions, but was saved by the chivalrous fidelity of the Hungarians, the assistance of Britain, and most of all by her own resolute spirit. Her enemies also quarreled amongst themselves; and the war of the Austrian succession, after lasting more than seven years, terminated in her favor by the peace of Aix-la-Chapelle in 1748. She lost only Silesia and Glatz, and the duchies of Parma, Piacenza, and Guastalla, whilst, on the other hand, her husband was elected emperor. During the time of peace she made great financial reforms; agriculture, manufactures, and commerce flourished, the national revenues greatly increased, and the burdens were diminished. The empress availed herself of the increase of the revenue for the increase of her military power. She held the reins of government herself, but was much guided by her husband and her ministers. She found at last in Kaunitz (q.v.) a minister possessed of the wisdom and energy requisite for the conduct of affairs, and in him she placed almost unlimited confidence. The *seven years' war* (q.v.) between Austria and Prussia again reduced Austria to a state of great exhaustion; but when it was concluded, the empress renewed her efforts to promote the national prosperity, and made many important reforms, ameliorating the condition of the peasantry, and mitigating the penal code. Her son Joseph was elected king of the Romans in 1764; and on the death of her husband, in 1765, she associated him with herself in the government of her hereditary states, but in reality committed to him the charge only of military affairs. She joined with Russia and Prussia in the partition of a third part of Poland (1772), after the death of Augustus III., although she at first objected to the proposed spoliation, and thought it necessary

to satisfy her conscience by obtaining the approval of the pope. Galicia and Lodomeria were added to her dominions at this time. She also compelled the porte to give up Bukowina to her (1777). The brief Bavarian war of succession ended in her acquisition of the Innthal, but led to the formation of the *fürstenbund* or *league of German princes*, which set bounds to the Austrian power in Germany. Maria Theresa died Nov. 29, 1780. Throughout her reign she displayed a resolute and masculine character, and raised Austria from deep depression to a height of power such as it had never previously attained. Although a zealous Roman Catholic, she maintained the rights of her own crown against the court of Rome, and endeavored to correct some of the worst abuses in the church. She prohibited the presence of priests at the making of wills, abolished the right of asylum in churches and convents, suppressed the inquisition in Milan, and in 1773 the order of Jesuits. She also forbade that any person, male or female, should take monastic vows before the age of 25 years. She did nothing, however, to ameliorate the condition of the Protestants in her dominions. She had three sons and six daughters. Her eldest son, Joseph II., succeeded her.

MARIAZELL', the most famous place of pilgrimage in Austria, on the n. border of the crownland of Styria, 24 m. n. of Bruck. It consists of a number of inns, or lodging-houses, and contains 1200 inhabitants. It is visited by 250,000 pilgrims annually. Here there is an image of the Virgin believed to possess the power of working miracles. During the great annual procession from Vienna, the greater number of the pilgrims of both sexes spend the night in the woods in drinking, singing, and general riot. Formerly, the processions from Gratz and Vienna took place at the same time, but owing to the fighting, as well as debauchery, that characterized the occasion, the processions were ordained to take place at different times.

MARICO'PA, a co. in e. central Arizona, bounded by New Mexico on the e.; traversed by Salt river and bounded s. by the Gila; 14,500 sq.m.; pop. in '76 estimated at 3,500. In the valleys, wheat, barley, and Indian corn are raised; the e. portion is rugged and mountainous, and here are found considerable gold, silver, copper, and lead. Apache Indians roam over the country. Chief town, Phœnix.

MARICO'PAS. See COCO-MARICOPAS.

MARIE AMÉLIE DE BOURBON, Queen of the French, wife of king Louis Philippe, 1782–1866; b. in Sicily; daughter of Frederick IV., king of the Two Sicilies; reared and educated in Sicily, Naples, and Venice. Louis Philippe, duke of Orleans, while banished from France, met her, and they were married Nov. 25, 1809. She bore him a large family of children, most of whom have been eminent for talents and high character. On the accession of Louis XVIII. they returned to Paris, and resided in France or in England until the French revolution of 1830, when Lafayette and Lafitte selected her husband as the best available leader of the liberal monarchic party, and made him king. She exhibited a repugnance to the elevation, fearing to have her husband considered a trespasser on the rights, which she seemed to respect, of the elder branch of the Bourbons. As queen she was a model of abstention from political intrigues, of every domestic virtue, and of the highest influence over her husband to good ends. Her home virtues, sympathetic nature, and public charities, made her dear to the French people, and prolonged the duration of a reign the duplicity and selfishness of which was in marked contrast to the disinterested beneficence of her own life and influence. When Louis Philippe was dethroned in 1848, she bore the fall with dignity and calmness quite in contrast with the hurried fear of her royal consort. She joined him at Claremont, England, where, under the name of the comptesse de Neuilly, she passed the remainder of her life, and closed the eyes of her husband in 1850, after 40 years of noble companionship and mutual fidelity. In her last years she sought to bring about a reconciliation with the elder branch of the Bourbon family. Five sons and three daughters were the fruit of her marriage. The eldest son, the duke of Orleans, died in 1842; the eldest daughter, a promising sculptress, died in 1839; the other sons have the titles of duke de Nemours, prince de Joinville, duke d'Aumale, duke de Montpensier. The princess Louise became queen of Belgium, and the princess Clémentine married the prince of Saxe-Cobourg. M. Trognon has published a *Vie de Marie Amélie, Reine des Français*, 1871.

MARIE ANTOINETTE DE LORRAINE, JOSEPHINE JEANNE, wife of Louis XVI. of France, was the youngest daughter of Francis I., emperor of Germany. Her mother was the famous Maria Theresa (q.v.). Marie Antoinette was born at Vienna, Nov. 2, 1755; at the age of 14 was betrothed to the dauphin; and in the following year was married at Versailles. Her reception by her husband and the king, Louis XV., was flattering enough; but her Austrian frankness and simplicity, her naïveté, unceremonious pleasantry, and detestation of rigid etiquette, scandalized Versailles. Soon after the accession of Louis XVI. (May, 1774), libels were circulated by her enemies, accusing her of constant intrigues, not one of which has ever been proved. Her faults as a queen (and, in that age, rapidly growing earnest, angry, and imbittered, they were fatal ones) were a certain levity of disposition, a girlish love of pleasure, banquets, fine dress, an aristocratic indifference to general opinion, and a lamentable incapacity to see the actual misery of France. The affair of the *diamond necklace* (q.v.) in 1785 hopelessly compromised her good name in the eye of the public, although in point of fact Marie

Antoinette was quite innocent of any grave offense. Her political rôle was not more fortunate. Loménie de Brienne and Calonne were ministers of her choice, and she shared the opprobrium called down upon them for their reckless squandering of the national finances. She strongly opposed the assembly of the notables, and in the following year, of the states-general; and, indeed, she had good reason to dread their convocation, for one of the very first things the notables did was to declare the queen the cause of the derangement of the finances. From the first hour of the revolution she was an object of fanatical hatred to the mob of Paris. Her life was attempted at Versailles by a band of assassins on the morning of Oct. 6, 1789, and she narrowly escaped. After this she made some spasmodic efforts to gain the good-will of the populace by visiting the great manufactories of the capital, such as the Gobelins, and by *seeming* to take an interest in the labors of the workmen, but the time was gone by for such transparent *shamming* to succeed. The relentless populace only hated her the more. At last she resolved on flight. Her husband long refused to abandon his country, and she would not go without him. A dim sense of kingly duty and honor was not wanting to Louis, but after the mob stopped his coach (April 18, 1791), and would not let him go to St. Cloud, he consented. The flight took place on the night of the 20th June. Unfortunately, the royal fugitives were recognized, and captured at Varennes. From this time her attitude became heroic; but the French people could not rid themselves of the suspicion that she was secretly plotting with the allies for the invasion of the country. After the useless effort to defend the Tuileries (Aug. 10, 1792), she was confined in the Temple, separated from her family and friends, and subjected to most sickening humiliations. On Aug. 1, 1793, she was removed to the Conciergerie, by order of the convention, condemned by the revolutionary tribunal (Oct. 15), and guillotined next day. See *Mémoires sur la vie privée de Marie Antoinette*, by Mme. Campan (1823); Feuillet de Conches, *Louis XVI., Marie Antoinette et Mdme. Élisabeth* (1864–73); D'Arneth, *Correspondance secrète entre Marie Thérèse et le Comte Mercy d'Argenteau, avec des lettres de Marie Thérèse et Marie Antoinette* (2d ed., 1875); and Yonge, *Life of Marie Antoinette* (1876).

MARIE DE' MEDICI, wife of Henri IV. of France, was the daughter of Francis I., grand-duke of Tuscany, and was born at Florence, April 26, 1573. She was married to Henri, Dec. 16, 1600, and in the following September gave birth to a son, afterwards Louis XIII. The union, however, did not prove happy. Marie was an obstinate, passionate, waspish, and withal dull-headed female, and her quarrels with Henri soon became the talk of Paris. She was—as such women are apt to be—wholly under the influence of favorites. A certain couple, who professed to be man and wife, Leonora Galigaï and Concini, exercised a most disastrous influence over her mind, and, of course, encouraged her dislike to her husband. The assassination of Henri (May 14, 1610) did not much grieve her, and she was even suspected of complicity in the act, but nothing was ever ascertained that could incriminate her. For the next seven years she governed as regent, but proved as worthless a ruler as she had been a wife. After the death of Concini a sort of revolution took place. Louis XIII. assumed royal power. Marie was confined to her own house, and her son refused to see her. Her partisans tried to bring about a civil war, but their attempts proved futile; and by the advice of Richelieu, then bishop of Luçon, she made her submission to her son in 1619, and took her place at court. Marie hoped to win over Richelieu to her party, but she did not in the least comprehend that mighty genius; however, she soon enough found out that he had no mind to be ruled by her, whereupon she resolved, if possible, to undermine his influence with the king. Her intrigues for this purpose failed; she was imprisoned in Compiègne, whence she escaped, and fled to Brussels in 1631. Her last years were spent in utter destitution, and she is said to have died in a hayloft at Cologne, July 3, 1642.

MARIE GALANTE, an island in the West Indies, one of the Lesser Antilles, belongs to France, and lies 17 m. s.e. of Guadeloupe. Area, about 60 sq.m., covered for the most part with wood, and surrounded by steep rocky shores. The cultivated soil produces sugar, coffee, and cotton. Cattle and horses are abundant, the latter of a highly esteemed breed. Its chief town, Grandbourg, or Marigot, on the s.w. coast, has a population of 2,000. The population of the island is 13,000. Marie Galante is so-called from the name of the ship commanded by Columbus when he discovered the island in 1493.

MARIENBAD, one of the most frequented of the Bohemian spas, 33 m. n.w. of Pilsen, at an elevation of almost 2,000 ft. above the level of the sea. The springs of Marienbad have long been used by the people of the vicinity, but it is only since the commencement of the present century that it has become a place of resort for persons from distant parts of the world. The springs are numerous, varying in temperature from 48° to 54° Fahr. They are saline, containing sulphate of soda and various alkaline ingredients, but differing considerably in their composition and qualities. They are used both internally and in the form of baths. Great quantities of the waters of some of the springs are exported to distant places. Marienbad is surrounded by wooded heights, has a population of 1600, and is visited every season by upwards of 9,000 patients.

MARIENBERG, a t. of Saxony, in the circle of Zwickau, 38 m. s.w. of Dresden. It has manufactures of linen, lace, and steam-engines, and the neighboring mines give employment to a great number of the inhabitants. Marienberg has mineral baths, and an establishment for the cold-water cure. Pop. '75, 5,956.

MARI'ENBURG, an old t. of Prussia, in the province of Prussia, on the Nogat, 28 m. s.e. of Danzig. It was long the seat of the grand masters of the Teutonic order (q.v.) of knights, who removed from Venice hither in the year 1300. The first fortress of the knights, however, was founded here in 1274. Marienburg remained in the hands of the knights till 1457, when it was taken by the Poles. The castle, or palace, in which 17 grand masters had resided, a noble edifice in a species of Gothic peculiar to the vicinity of the Baltic, was restored in 1820. Pop. '75, 8,538.

MARI'ENWERDER, one of the most prosperous and beautiful towns of the province of Prussia, in the kingdom of Prussia, is picturesquely situated on an elevation, about 2 m. e. of the Vistula, and 47 m. s.s.e. of Danzig. It was founded in 1233 by the Teutonic order of knights, and its old castle was the residence of a commander of that order. The town derives its prosperity chiefly from being a residence of numerous government officials. Manufactures of various kinds are carried on, and fruit is extensively cultivated. Pop. '75, 7,627.

MA'RIES, a co. in s. central Missouri; drained by the Gasconade river and its affluents; 550 sq.m.; pop. '80, 7,323. The surface is broken and hilly, and only in the valleys is there much fertility. Indian corn is the chief product, 163,479 bushels being raised; 79,243 of wheat. The baser metals are found, but not in great abundance. Chief town, Vienna.

MARIETTA, the chief t. in Washington co., Ohio, on the e. bank of the Muskingum, at its union with the Ohio river; and the terminus of the Marietta and Cincinnati, and Marietta, Pittsburg, and Cleveland railroads; 150 m. from Columbus, 175 m. from Cleveland, and 300 m. from Cincinnati by way of the rivers; pop. '70, 5,218. The town was settled by New England emigrants in 1788, and is the oldest town in Ohio. The town is neatly laid out and handsomely embellished, and is the seat of Marietta college, which was chartered in 1835 and graduated its first class in 1838. Marietta is the center of an extensive business in petroleum, and is not distant from large deposits of coal and iron. There are 3 newspapers, 4 banks, a library, city hall, art gallery, and a very large number of refineries, factories, foundries, shops, and stores. The schools have long been noted for their superior qualities. A description of ancient mounds and works on the site of the city will be found in *Ancient Monuments of the Mississippi Valley*, by Squier and Davis. These have been in great measure destroyed by the building of the city, but traces of them still remain. The name Marietta was bestowed in honor of the French queen, Marie Antoinette.

MARIETTA COLLEGE, at Marietta, Washington co., O., was founded in 1835. The grounds occupy a pleasant square, and the college has four buildings. In 1878 it had 11 instructors and 80 students, G. W. Andrews, D.D., LL.D., president.

MARIETTE, AUGUSTE ÉDOUARD, b. at Boulogne-sur-Mer, 1821; became professor of grammar and design, and while engaged in these duties was drawn to the study of archæology. Attracting attention by an article published in 1847 on the history of his native town, he was made assistant in the Egyptian museum of the Louvre, where he became so intelligent a disciple of the lore of Champollion in Egyptian hieroglyphics that he was sent to Egypt to gather Coptic manuscripts. While there he searched for the true site of Memphis, and by his familiarity with ancient authors, not only found the remains, but identified the temples, monuments, and tombs, by their descriptions. His discoveries were gratefully acknowledged by the French government, and increased means for investigation were placed in his hands by the duke de Luynes. His principal excavations for Memphis were made 4 m. from the spot where the archæologists had previously searched, and resulted in uncovering an avenue of sphinxes, the temple of Serapis mentioned by Strabo, one of the most splendid structures of granite and alabaster of the ancient time, in which were found the sarcophagi of the bulls of Apis from the 19th dynasty to the time of the Romans. The labors of 1500 men under his hand brought to light 2,000 sphinxes and between 4,000 and 5,000 statues, and inscriptions and curiosities without number. Some of the statues were evidently of Grecian art. The explorations have served to confirm the fact of the greatness of the city of Memphis, its wealth and luxury. His excavations around the great sphinx of Gizeh brought to light many new facts and curiosities, which have been added to the collections of Egyptian curiosities in the Louvre. On his return to Paris in 1854 he was made conservator of the Egyptian museum. In 1858 he was again in Egypt following up his former searches with a large force of workmen, removing the sands that covered the temples of Elfou, Karnak, Médinet-Abou, etc. The viceroy of Egypt then made him conservator of the monuments of Egypt, with title of bey, and charged him with the formation of a collection of his precious discoveries at Boulak. In 1873 the institute of France awarded him the biennial prize of 20,000 francs. He is considered the most eminent of French *Egyptologues*. The following are some of his works: *Mère d'Apis*, 1856, 8vo, a light on the religion of the Egyptians; *Choix de Monuments et de dessins, découverts ou exécuté pendant le déblayement du Sérapéum de Memphis*, 1856, 4to; the *Sérapéum de Memphis*, in folio, with plates, 1857–64; *Aperçu de l'histoire d'Egypt*, 1864, 8vo; *Nouvelle table d'Abydos*, with plates, 1865, 8vo; *Fouelles exécutée en Egypt, en Nubie, et au Soudan, d'après les ordres du viceroi*, folio, with maps and plates, 1867; *Notice des principaux*

monuments du musée de Boulak, 1870, 8vo; *Les Papyrus égyptiens du musée de Boulak*, folio, 1871; and *Album du musée de Boulak*, folio, illustrated by 40 superb photographic plates, representing 600 objects of Egyptian art, published in 1873. Upon his death the khedive took charge of the embalming of his body, and its deposit in an ancient sarcophagus.

MARIGLIANO, a t. of s. Italy, province of Caserta, not far from Nola. It has a castle and several churches, one of which has a good collection of pictures. Pop. '70, 5,182.

MARIGNA'NO. See MELEGNANO, *ante*.

MARIGOLD, a name given to certain plants of the natural order *compositæ*, sub-order *corymbiferæ*, chiefly of the genera *calendula* and *tagetes*. The genus *calendula* has the achenia remarkably curved, variously toothed, and very rough on the back. The species are annual and perennial herbaceous plants and shrubs, of which some of the former are found in the countries bordering on the Mediterranean, the latter chiefly in s. Africa. POT MARIGOLD (*C. officinalis*) is an annual, a native of France and the more southern parts of Europe, with an erect stem, 1 to 2 ft. high, the lower leaves obovate on long stalks, and large, deep yellow flowers. It has long been very common in British gardens, and there are varieties with double flowers. The whole plant has a slight aromatic odor, and a bitter taste. It was formerly in great repute as a carminative, and was regarded also as an aperient and sudorific. The florets were the parts used, and they were dried in autumn, to be preserved for use. They are often employed to adulterate saffron, and sometimes for coloring cheese. They were formerly a frequent ingredient in soups, and are still so used in some parts of England.—The genus *tagetes* consists of annual and perennial herbaceous plants, natives of the warmer parts of America, although *T. erecta*, one of those most frequently cultivated in Britain, bears the name of AFRICAN MARIGOLD; and *tagetes patula*, another annual well known in our flower-borders, is called FRENCH MARIGOLD. Both species are Mexican. They have been long in cultivation, and with a little assistance of a hot-bed in spring, succeed well even in Scotland, and are much admired for the brilliancy of their flowers.—CORN MARIGOLD is a *chrysanthemum* (q.v.).—Marsh Marigold (q.v.) has no botanical affinity with the true marigolds.

MARIN', a co. in w. California, bounded w. by the Pacific, s. and e. by San Pablo bay, San Francisco bay, and the Golden Gate, the last separating it from the city of San Francisco; 500 sq.m.; pop. '80, 11,325. It is traversed by the North Pacific Coast railroad. The surface is marked by many hills, the highest of which, Table mountain, is 2,600 ft. high. It is the largest butter-producing county in the state, the amount in 1870 being over 2,000,000 pounds. Chief city, San Rafael.

MARI'NA, MALINTZIN, or MALINCHE, b. Mexico, probably in the last years of the 15th century. She was of a noble family in the province of Guazacoalcos, but when a child was sold in slavery to the Maya Indians. Soon after Cortez invaded Mexico she became his interpreter and his mistress. Their son, don Martino Cortez, attained to considerable importance in Mexico. She was afterwards married to Juan de Jaramillo, and was living as late as 1550.

MARINED, a term applied in heraldry to an animal whose lower part is terminated like the tail of a fish.

MARINE ENGINE. See STEAM-ENGINE.

MARINE FORTIFICATION differs from land fortification in that the approaches of the enemy which are to be resisted take place on the level of the sea, so that he can come near without having to overcome the dangerous slope of the glacis. The combat is simply one between two powerful batteries, and the question to be decided is whether the ship or the fort will first be placed *hors de combat;* the ship having ordinarily the largest number of guns, while the fort has more solid battlements, and its fewer guns of great caliber can be fired with a steadiness unattainable on so shifting a base as the ocean. Under these circumstances, the less relief a sea-fortress has the better, as by so much the less is it likely to be hit from the shipping. Its walls are usually built perpendicular, or nearly so. The magazines and quarters for the men are bomb-proof, as also are the casemates, from which the guns are usually fired, although sometimes, as in the martello-tower, the gun is worked on the top of the structure.

Sea-fortifications may be of various importance, the simplest being the battery consisting of a mere parapet formed in a cliff or on a hill, and mounted with guns to command the sea; these are generally built in such concealed situations that it is hoped the hostile ships will not perceive them until they actually open fire. They are numerous all around the British coast. Next greater in importance is the martello-tower (q.v.). More powerful still are the beach-forts, such as those which on either shore defend the entrance to Portsmouth harbor: these are constructed of the most solid masonry, faced with massive iron plates, and armed with guns of the heaviest caliber, sweeping the very surface of the sea, so as to strike an approaching ship between wind and water. The guns are usually in bomb-proof casemates, and the fort is often defended on the land side if the coast be level; if, however, higher ground be behind, this would be useless, and then the sea-front alone is defensible. Most terrible of all sea-forts, how-

ever, are the completely isolated forts, with perpendicular faces and two or three tiers of heavy guns. Such are the tremendous batteries which render Cronstadt almost inapproachable, and by which Spithead and Plymouth sound are now fortified. These forts are generally large, with all the requisites for a garrison to maintain itself; against them wooden ships stand no chance, and in the American civil war fort Sumter, at Charleston, showed itself no mean antagonist for ironsides. In such forts iron is employed as the facing, in plates of such vast thickness and weight that it is supposed no ship can ever possess any comparable resisting power; and, as they are armed with guns the smallest of which will probably be 300-pounders, it is expected that they will be able to destroy any fleet that could be sent against them.

At the present day the value of sea-fortifications is disputed, as iron-plated vessels may pass them with impunity unless the artillery in the fort be so heavy as to destroy the armor of the ships. In the long run, however, it is apparent that the fort can command the greater power, for its armor may be of any thickness, while that of the ship must be limited by her floating powers, and, on the other hand, the limit to the size of artillery must be sooner reached in a ship than in a solid and stationary fortress.

MARINE'O, a t. of Sicily, in the province of Palermo, and 11 m. s. of the town of Palermo, near a small river which flows into the gulf of Palermo. Pop. 8,360.

MARINER'S COMPASS. See COMPASS, *ante*.

MARINES are soldiers that serve on board ships of war. The men are drilled in all respects as soldiers (light infantry), and therefore on shore are simply ordinary land-forces. On board ship they are trained to seamen's duties, but still preserving their military organization. Their ordinary functions are as sharpshooters in time of action, and at other times to furnish sentries for guarding the stores, gangways, etc. They are useful as exercising a good control over the less rigidly disciplined sailors, and, having always firearms and bayonets ready, they have often been instrumental in suppressing the first outbreaks of mutiny. The royal marines are divided into three divisions of light infantry and one of artillery. Promotion goes by seniority throughout the artillery and infantry respectively. In rank marine officers correspond with army officers of similar grades according to seniority; as a corps the marines take place between the 49th and 50th regiments of infantry of the line. Every ship, on being commissioned, has her complement of marines drafted into her. The uniform is red, with blue facings and white belts. On their colors the men proudly bear the word "Gibraltar," in the famous defense of which fortress they bore an heroic part.

Marines were first established, as a nursery from whence to obtain seamen to man the fleet, by order in council of Oct. 16, 1664. Their utility becoming conspicuous, other regiments of marine forces were raised, so that by 1741 there were 10,000 men, and in 1759 as many as 18,000. During the great French war the number rose above 30,000, but a great reduction took place after peace was concluded. By the navy estimates of 1875–76, 14,000 marines were provided, including 2,900 artillery, at a cost for the year of £940,417. Their government rests solely with the admiralty.

MARINES (*ante*). The introduction of marines into the American army took place by act of congress passed Nov. 10, 1775, by which two battalions of this arm were directed to be organized. Again, by act of July 11, 1798, "establishing and organizing a marine corps," this body became an established element in the naval force of the United States, liable to do duty either on board vessels of war at sea, or in forts or otherwise upon shore, as might be directed by the president. The commandant of the corps has the rank and pay of col. It has no regimental organization, however, but "may be formed into as many companies or detachments as the president may direct." When employed on naval service the marines are subject to the laws and regulations which govern the navy; but if engaged on shore duty they are amenable to the authority of the articles of war. The number of marines was fixed by the act of July, 1861, at 3,074 enlisted men, but this is practically lessened by the amount of the annual appropriations for the naval department. The United States marine corps consisted in 1880 of 86 officers and 1500 enlisted men.

MARINE-STORE DEALERS, in point of law, are subjected to certain restrictions as regards the business they carry on, in order to keep some check on their relations with thieves and other vendors of stolen property. They are bound, under a penalty of £20, to have their name and the words "dealer in marine stores" distinctly painted, in letters not less than 6 in. in length, over their warehouse or shop; to keep books stating the name of the person from whom they bought or received the respective articles in their possession; not to purchase marine stores from any person apparently under 16 years of age; not to cut up any cable or article exceeding five fathoms in length without a permit from justices of the peace. By the act 24 and 25 Vict. c. 101, dealers in old metals have also been subjected to similar restrictions. Whenever a dealer in old metal has been once convicted of being in possession of stolen property, justices of the peace may order him to be registered at the chief police-office of his district, and he shall keep a book containing entries of the goods he has and of the person from whom obtained, etc.

MARINI, GIOVANNI BATISTA, an Italian poet, b. at Naples in 1569. After a period of fruitless study, Marini abandoned jurisprudence for the more congenial pursuit of

poetry, a decision which so incensed his father as to lead to his expulsion from home. All through life, Marini seems to have courted troubles by his unbridled licentiousness, and many of his best compositions are polluted with a shameless obscenity, unavailingly deplored by the poet at the approach of death, when he expressed the desire that they should be suppressed and destroyed. Marini quitted Naples for Rome, and finally followed in the suite of cardinal Aldobrandini to Turin, where he was at first received with flattering notice from the reigning prince, Charles Emmanuel; but on the publication of some biting satirical verses, he was thrown into prison. On his release, he repaired to France, where Marie de' Medici received him with marked favor, and conferred on him a liberal pension. In his poem *Il Tempio* he celebrates this queen's noble qualities. His best work, the *Adone*, was written during his residence in France, and on its publication, he revisited his native country (1622), and died at Naples, aged 56, in 1625, in the midst of high public festivities in his honor. He is the founder of the *Marinist* school of poetry, of which the essential features are florid hyperbole and false overstrained imagery.

MARI'NO. See SAN MARINO, *ante*.

MARI'NO (anc. *Bovillæ*), a market-t. of central Italy, province of Rome, and 12 m. s.e. of the city of Rome, near lake Albano. Marino is situated on a high hill above a plain, and is surrounded by strong walls and towers, which were erected by the Colonna in 1480, and add much to its picturesque beauty. According to the writer of *Murray's Handbook*, the long street called the Corso, the piazza of the Duomo, and the fountain would do credit to many towns of more importance. At the foot of the hill of Marino, lying between it and the ridge of Alba Longa, is a deep glen beautifully wooded, called the *Parco di Colonna*. This valley is highly interesting as the site of the *Aqua Ferentina*, memorable as the spot on which the Latin tribes held their general assemblies, from the destruction of Alba to the consulship of P. Decius Mus, 338 B.C. Marino is also interesting in the history of the middle ages as the stronghold of the Orsini family, who first appear in the 13th c. in connection with their castle of Marino. In the 15th c. it became the property of the Colonna family, who have retained it almost without interruption to the present time. Pop. 6,500.

MARIO, GIUSEPPE, Marquis de Candia, was b. at Turin in 1810, of an aristocratic family, and evinced from his boyhood high musical abilities. In 1830 he received his commission as officer in the chasseurs Sardes; but having involved himself in some youthful escapade, was ordered from Genoa to a temporary retreat at Cagliari. From thence he threw up his commission, and finally escaped to Paris, on his resignation not being accepted. The young Sardinian deserter speedily won his way into the most exclusive circles of fashionable Paris, both by the genuine, manly stamp of his nature, and the charm of his exquisite voice. Having contracted debts, however, he accepted the appointment of first tenor of the opera, with a salary of 1500 francs per month; at the same time he changed his name from marquis of Candia to Mario. After a term of two years' study at the conservatoire, Mario made his début, on Dec. 2, 1838, in *Robert le Diable*, and achieved the first of a long series of operatic triumphs. At the théâtre Italien, he took rank with Rubini, Lablache, Malibran, Sontag, and Grisi; and by none of these great artists was he excelled in purity, sweetness, method, and taste. From 1845 to 1850 he fulfilled an engagement in Russia, and on his return appeared in London, where his success was immense. Mario's operatic career was a succession of brilliant and remunerative engagements. In his private capacity, he was esteemed for his large-handed liberality, and for his noble assistance to struggling artists. His répertoire embraced all the great works of Rossini, Bellini, Donizetti, and Verdi. Mario took farewell of the London stage in 1871.

MARIOL'ATRY (Gr. *Maria*, and *latreia*, adoration), a name given by polemical writers to the worship paid by Roman Catholics to the Virgin Mary. This name is intended to imply that the Catholic worship of the Virgin is the supreme worship of *latreia* or adoration, which Catholics earnestly disclaim, although, from her relation to our Lord, they hold her worship, which they style *hyperdulia*, to be higher than that of all other saints. See INVOCATION OF SAINTS. Many examples of prayers addressed to Mary, of acts of worship done in her honor, and of expressions employed regarding her are alleged by controversialists, for the purpose of showing that the worship of Mary in the Roman church is in effect "adoration." Such are (see Farrar's *Ecclesiastical Dictionary*, p. 372) the "Litany of the Sacred Heart of Mary;" the adaptation of the Athanasian creed as a profession of faith regarding her; addresses to her as the "hope of the desponding, and refuge of the destitute;" professions that "her son has given her such power that whatever she wills is immediately done;" kneelings and prostrations before her image; pilgrimages in her honor. To these and similar allegations, Roman Catholics reply that many of the objected prayers and devotional practices are entirely unauthorized by the church, and that some of them are undoubtedly liable to misinterpretation; but they further insist that all such prayers, however worded, are to be understood, and are, in fact, understood by all Roman Catholics, even ordinarily acquainted with the principles of their faith, solely as petitions for the intercession of Mary, and as expressions of reliance, not on her own power, but on the efficacy of her prayers to her son. It would be out of place in this work to enter into such controversies, and we shall content ourselves with a brief account of the origin and nature of the worship of the Virgin Mary in the

church, and of its present condition, as it is professed by those religious bodies among which the practice now prevails.

Although no trace is found in the New Testament of any actual worship of the Virgin Mary, yet Roman Catholic interpreters regard the language of the angel Gabriel, who saluted her as "full of grace," or highly "favored," and as blessed "among women," and her own prediction in the canticle of the magnificat, that "all nations should call her blessed" (Luke i. 48), as a foreshadowing of the practice of their church; and they rely equally on the language employed by the early fathers, as, for instance, Irenæus, regarding the Virgin, although Protestants consider it as having reference to the incarnation. But it seems quite certain that, during the first ages, the invocation of the Virgin and the other saints must have held a subordinate place in Christian worship; the reason for which, according to Roman Catholics, was probably the fear which was entertained of reintroducing among the recent converts from paganism the polytheistic notions of their former creed. But from the time of the triumph of Christianity in the 4th c., the traces of it become more apparent. St. Gregory Nazianzen, in his panegyric of the virgin martyr Justina, tells, that in her of peril she "implored Mary the Virgin to come to the aid of a virgin in her danger" (Opp. tome i. pp. 278, 279). St. Ephraim, the Syrian, in the same age, uses language which is held by Roman Catholics to be equally favorable to their view; and the fact that about this time there arose a sect, the Collyridians, who were condemned for the actual *adoration* of the Virgin, seems to them to prove that some worship of her must have existed in the church, out of which this excessive worship of the Collyridians grew. But it was only after the heresy of Nestorius that the worship of Mary seems to have obtained its full development. His denial to her of the character of mother of God, and the solemn affirmation of that character by the ecumenical council of Ephesus (430 A.D.), had the effect at once of quickening the devotion of the people, and drawing forth a more marked manifestion on the part of the church of the belief which had been called into question. The 5th and 6th centuries, both in the east and in the west, exhibit clear evidence of the practice; and the writers of each succeeding age till the reformation speak with gradually increasing enthusiasm of the privileges of the Virgin Mary, and of the efficacy of her functions as a mediator with her son. St. Bernard, and, still more, St. Bonaventura, carried this devotional enthusiasm to its greatest height; and the popular feeling found a stronger and still more strong manifestation in the public worship of the church. From a very early period, we find several festivals of the "blessed Virgin;" but in the centuries to which we refer, the number received large additions. The institution of the "Rosary of the Virgin Mary," the appointment of a special office in her honor, and more than all, the fame of many of the sanctuaries which were held to be especially sacred to her worship, gave a prominence to the devotion which Protestants find it difficult to reconcile with the honor which they hold due to God alone.

The chief festivals of the Virgin, common to the western and eastern churches, are the conception, the nativity, the purification, the annunciation, the visitation, and the assumption. All these festivals are retained in the English calendar. The Roman church has several special festivals, with appropriate offices—all, however, of minor solemnity.

MARION, a co. in n.w. Alabama, having the state line of Mississippi for its n.w. boundary; bounded on the n.e. by the Big Bear river; 900 sq.m.; pop. '80, 9,364—9,362 of American birth, 523 colored. It is drained by the Buttahatchie and Sipsey creeks, branches of the Tennessee and Tombigbee rivers. Its surface is undulating, rising into hills in some sections containing beds of bituminous coal, a large proportion being covered with forests, Its agricultural products are tobacco, cotton, wool, sweet-potatoes, butter, honey in large quantities, sorghum, oats, corn, rye, and wheat. Cattle, sheep, and swine are raised. Seat of justice, Pikeville.

MARION, a co. in n. Arkansas, having the state line of Missouri for its n. boundary, the White river for its s.e., and the Buffalo Fork, one of the chief affluents of the White river, for a part of its s. border; 600 sq.m.; pop. '80, 7,907—7,895 American birth, 43 colored. It is drained by Crooked creek, flowing centrally through it into White river, and has a surface formed of the ridges of the Ozark mountains, partially covered with groves of chestnut, ash, hickory, etc. Its soil is adapted to the raising of fruit, live stock, every kind of grain, tobacco, cotton, sweet-potatoes, and sorghum. Honey is produced in large quantities, and the products of the dairy. Its mineral products are lead ore, variegated marble, and silurian limestone. Seat of justice, Yellville.

MARION, a co. in n. Florida, intersected by the Ocklawaha river, flowing into lake Griffin in the next county; has for its n.e. boundary lake George and the St. John's river, and has Orange lake in the extreme n., and smaller lakes, including Bryant and Ware in the e. section; 2,000 sq.m ; pop. '80, 13,046—12,961 of American birth, 8,305 colored. The Withlacoochee river forms part of its s.w. boundary. Extensive forests of good building timber grow along the river banks and surround the lakes; in other sections the level surface spreads out into fertile plains. Its agricultural products are tropical fruits, rice, oats, cotton, and corn, and its soil is specially adapted to the cultivation of sugar-cane and oranges. Carriages are manufactured. Seat of justice, Ocala.

MARION, a co. in w. Georgia, drained by the head waters of the Flint river and Kinchafoonee creek; 450 sq.m.; pop. '80, 8,598—8,595 of American birth, 4,307 colored. The Southwestern railroad crosses the extreme n.w. corner. Its surface, generally level, is covered to a great extent with hardwood timber, and the growth of swampy districts. Its soil produces fruit, oats, corn, tobacco, cotton, rye, wool, sweet potatoes, butter, honey, and sugar-cane. Much attention is paid to the raising of live-stock. Seat of justice, Buena Vista.

MARION, a s. central co. of Illinois, intersected by the Illinois Central and Ohio and Mississippi railroads; 576 sq.m.; pop. '80, 23,691. It is a prairie country, the productions being grain, cattle, and wool. Co. seat, Salem.

MARION, a central co. of Indiana, the converging point of 12 completed railroad lines (see INDIANAPOLIS); 420 sq.m.; pop. '80, 102,780. It possesses a level surface, except in the northern part. The soil is fertile, producing grain and hay in large quantities. Other productions are cattle and wool. Co. seat, Indianapolis.

MARION, a s. central co. of Iowa, watered by the Des Moines river, and intersected by the Des Moines Valley railroad. It has a varied surface and fertile soil. The productions are coal, iron, cattle, grain, and wool. Co. seat, Knoxville.

MARION, a co. in s.e. central Kansas; 950 sq.m.; pop. '80, 12,457—American, 3,603. The increase in population is most remarkable, the census of '70 giving but 768; the estimate of '75, 5,907; and of '78, 8,306. The county is drained by Cottonwood creek, which furnishes water-power. The surface is a rolling plain, and produces corn, wheat, and hay in great abundance. Stock-raising is a leading industry. Traversed by Atchison, Topeka and Santa Fe railroad. Chief town, Marion Center.

MARION, a central co. of Kentucky, watered by branches of Salt river, and intersected by a branch of the Louisville and Nashville railroad; 335 sq.m.; pop. '80, 14,691. The surface is varied in character, the soil is fertile, and grain, tobacco, and wool are produced in large quantities, while live stock is largely raised. Co. seat, Lebanon.

MARION, a co. in s.w. Mississippi, having the state line of Louisiana for its s.w. border, is intersected by the Pearl river in the w. section; about 1500 sq.m.; pop. '80, 6,901—6,899 of American birth, 2,450 colored. It is drained by Black and Red creeks, affluents of Leaf river. Its surface is generally level, partially tillable, and largely covered with timber. Its soil is sandy, and not remarkably productive; but there is a fair farming district near the Pearl river, where the products are tobacco, cotton, wool, sweet potatoes, butter, honey, sugar-cane, rice, oats, corn, and live stock. Seat of justice, Columbia.

MARION, a co. in n.e. Missouri; 460 sq.m.; pop. '80, 24,837—22,828 of American birth. The Mississippi river bounds it on the e., and it is also drained by the North and South rivers, and the n. and s. forks of the Fabius. It is traversed by the Hannibal and St. Joseph railroad. The surface is in part prairie and in part forest. Principal products: wheat, oats, hay, and Indian corn. Chief town, Palmyra.

MARION, a n. central co. of Ohio, intersected by the Atlantic and Great Western and Bee-line railroads; 360 sq.m.; pop. 80, 20,564. It is a level and fertile region, producing, cattle, grain, and wool, and manufacturing large quantities of lumber. Co. seat, Marion.

MARION, a co. in w. Oregon, bounded e. by the Cascade range, and w. by the Willamette river, by which, with its tributaries, it is drained; pop. '80, 14,576. It is traversed by the Northern California railroad. The principal products are the cereals, and in 1870 there were raised 232,091 bushels of wheat, and 164,087 of oats. Sheep-breeding is carried on to some extent. The e. part of the county is hilly and mountainous, but contains considerable quantities of the precious metals, and of iron and coal. The chief town, Salem, is also the capital of the state.

MARION, a co. in e. South Carolina, having the Little Pedee river for its e. boundary, Lynch's river for its s. and s.w.; intersected in the w. section by the Great Pedee, and having the state line of North Carolina for its n.e. boundary; 1050 sq.m.; pop. '80, 34,107—34,042 of American birth, 18,228 colored. The Wilmington, Columbia and Augusta railroad crosses it centrally. Its surface is generally level and equally divided between forest and cultivated land. Its soil is a sandy loam, very fertile in some localities, producing fruit, tobacco, cotton, oats, corn, sweet potatoes, wool, wine, butter, sugar-cane, and large quantities of honey, rye, and wheat; other products are turpentine and tar. Cattle, sheep, and swine are raised. Seat of justice, Marion Court-House.

MARION, a co. in e. Tennessee, having the state line of Alabama for its s. boundary, is drained by the Tennessee river running at the foot of a range of the Cumberland mountains in the s.e. section, and the Sequatchie river emptying into it in the same region; 700 sq.m.; pop. '80, 10,911—10,712 of American birth, 1369 colored. It is traversed in the s. section by the Bridgeport, Alabama, to Victoria, Tennessee, division of the Nashville, Chattanooga and St. Louis railway; by the Sequatchie branch centrally to Victoria; and the Sewanee railroad crossing its n.w. corner. A large proportion of the surface, which along the rivers rises into steep high bluffs or buttes, is covered with forests or occasional groves, and the soil is productive. Corn, tobacco, cotton, fruit,

wool, sweet potatoes, wine, and great quantities of honey are produced; other products are sorghum, maple sugar, every kind of grain, and live stock in large numbers. Bituminous coal, iron ore, and fire-clay are mined, and its principal industries are connected with their mining and manufacture. In the n.w. are medicinal springs impregnated with iron. Seat of justice, Jasper.

MARION, a co. in n.e. Texas, having the state line of Louisiana for its e. boundary, is drained by the navigable Caddo lake 20 m. in length, comprising a third of the e. section, and Big Cypress bayou, flowing through it from n.w. to the s.e. section; about 300 sq.m.; pop. '80, 10,985—10,745 of American birth, 7,229 colored. It is traversed centrally by the Jefferson division of the Texas and Pacific railroad, forming a junction with the East Line and Red River railroad at Jefferson. Its surface is uneven and well wooded with every kind of timber. Iron ore is among its mineral products, and mineral springs appear in some localities. Its soil has every element of fertility, especially the bottom lands, producing sweet potatoes, corn, live stock in general; great numbers of beef cattle and large quantities of cotton are raised, which are among its exports. Its manufactories include iron foundries and tanneries. Seat of justice, Jefferson.

MARION, a co. in n. West Virginia, intersected from s.w. to n.e. by the Monongahela river, and from n.w. to s.e. by the Baltimore and Ohio railroad; 330 sq.m.; pop. '80, 17,198—17,052 of American birth, 155 colored. The Monongahela river is navigable to Fairmont, and the co. is also drained by Trygart's Valley river. Its surface is uneven, and largely covered with forests. Its soil is very fertile, and its agricultural products are fruit, buckwheat, Indian corn, wool, flax, maple sugar, sorghum, oats, wheat, honey, live stock, and dairy products. Among its mineral products are bituminous coal, iron ore, and glass sand. Its manufactories are tanneries and lumber mills; also, thrashing-machines, flour, cigars, furniture, and machinery are manufactured, and coal is mined. Seat of justice, Fairmont.

MARION, the chief t. of Perry co., in w. central Alabama; pop. 2,646. It is 28 m. from Selma, on the Selma, Marion and Memphis railroad, and is the seat of the Howard Baptist college, founded in 1837; and also of the Marion and Judson seminaries for girls. There are two weekly papers, a bank, six churches, a few machine-shops; and the place has a good trade in cotton and corn with the surrounding country.

MARION, a t. in Ohio, near the center of Marion co., 85 m. n.e. of Dayton, 40 m. n. of Columbus. It is on the Atlantic and Great Western, Columbus and Toledo, and Cleveland, Columbus, Cincinnati and Indianapolis railroads. It has a court-house, 3 newspapers, banks, and 9 churches. There are grain-elevators, machine and carriage shops, and manufactories of chairs, sashes and blinds, chains, and rakes. Pop. of whole township, '70, 3,486.

MARION, FRANCIS, 1732–95; b. near Georgetown, S. C. He received a scanty education, and after a trial of seafaring life, in which he was wrecked and with difficulty rescued, engaged in farming. When the war with the Cherokee Indians arose, 1759, he immediately enlisted, and as a cavalry lieut. did good service in the campaigns of 1759–61. At the outbreak of the revolution, Marion was chosen a delegate to the South Carolina congress, but soon organized a company of volunteers in his neighborhood, and placed it under the command of col. William Moultrie. His first active service was in Charleston harbor, and later in the defense of fort Moultrie, June 28, 1776; and his gallant conduct there was rewarded by promotion to the rank of lieut.col. He was present at the siege of Charleston, 1780, having meanwhile been actively engaged in various parts of Georgia and South Carolina. He was not in the city at the time of its surrender to gen. Clinton, owing to a severe accident which kept him from duty. After that disaster, Marion, then a col., raised several companies of volunteers among the country lads, or "cowboys" as the tories called them, and with this force marched to the relief of gen. Gates, at that time in North Carolina. Though poorly armed, wretchedly dressed, and at first exposed to much ridicule on that account, Marion's brigade proved of the greatest value, through their intimate knowledge of localities and the native shrewdness which earned for their leader the *sobriquet* of "Swamp Fox." From the Pedee to the Santee river, and from the sea-coast back to the central counties, the imperfectly drilled, but sturdy and enthusiastic brigade seemed to cover all points at once, and caused no little embarassment to the British forces. Among the most noted of the engagements in which Marion took part, may be named fort Moste, fort Wilson, Granby, Parker's ferry, and Eutaw. At the close of the war gen. Marion resumed his former occupation, and remained on his plantation till his death.

MARIONETTES, little jointed puppets of wood or cardboard, representing men and women, and moved by means of cords or springs by a concealed agent. They are exhibited in what are called marionette theaters, the exhibitor varying his voice, so that a sort of dramatic performance is accomplished. This entertainment was known to the Greeks, and from them passed to the Romans. In modern times, it has chiefly prevailed in France and Italy, and has there reached a very respectable degree of artistic perfection

MARION HARLAND (*pseud.*). See TERHUNE, MARY VIRGINIA.

MARIOTTE, EDME, a distinguished French natural philosopher, was b. in Burgundy during the first half of the 17th c., and was the prior of St. Martin-sous-Beaune, when the academy of sciences admitted him within its pale in 1666. His life is devoid of particular interest, having been almost wholly spent in his cabinet, among his books and instruments. He died in 1684. Mariotte's forte consisted in an extraordinary power of drawing conclusions from experiment. He repeated Pascal's experiments on gravitation, and detected some peculiarities which had escaped that ingenious philosopher; confirmed Galileo's theory of motion; enriched hydraulics with a multitude of discoveries; and finally made a thorough investigation into the subject of the conduction of water, and calculated the strength necessary for pipes under different circumstances. His collected works were published at Leyden in 1717, and at the Hague (2 vols. 4to) in 1740. His *Traité du Mouvement des Eaux* was published by La Hire (Paris, 1786, 12mo).

MARIOTTE, LAW OF, an empirical law deduced by Boyle (q.v.) and Mariotte (q.v.) from two independent series of experiments, though, strangely enough, reached by both at about the same time. It is generally expressed as follows: *The temperature remaining the same, the volume of a given mass of gas is in inverse ratio to the pressure which it sustains.* This law may be held to be substantially correct within a considerable range of pressure. But the labors of Regnault have made it evident that atmospheric air and most other gases, especially under very high pressures, are really more compressed than if they followed the law. This deviation is most marked in the case of gases capable of being liquefied, as they approach the point of liquefaction.

MARIOTTE'S INSTRUMENT, a J-shaped tube for demonstrating the law of Mariotte or Boyle, that the volume of a gas is inversely as the pressure upon it. The closed end of the J is only a few inches in length, while the open end is over 30 inches. Mercury being poured in till it is 30 in. higher in the long than in the short leg, it will be found that the air in the latter will occupy one-half its former space. If the column of mercury is 15 in. higher in the long leg, or half an atmosphere, making the pressure altogether $\frac{3}{2}$ of an atmosphere, the volume of air in the closed or short end will have $\frac{2}{3}$ of its former volume. See MARIOTTE, LAW OF, *ante*.

MARIPO'SA, a co. in e. central California; 1440 sq.m.; pop. '80, 4,339—1839 being foreign. It is drained by the Merced and Mariposa branches of the San Joaquin river; on the n. and e. it is bounded by spurs of the Sierra Nevada. In the n.e. part are the far-famed Yosemite falls and some of the grandest and most picturesque scenery of the world. More to the s. are three collections of mammoth trees, containing more than 425 specimens, of which 134 are over 15 ft. in diameter. Many of them are from 275 to 375 ft. in height and from 25 to 34 ft. in diameter. It is supposed that the age of some of these trees is at least 2,500 years. The entire country is rich in gold mines and has been the scene of very extensive mining operations. The western part is level and fertile; in 1870 there were produced over 12,000 bushels of wheat and barley; wool and hay are also staples, and sheep breeding is carried on with great success. Chief town, Mariposa

MARIS'CAL, IGNACIO, b. Mexico, 1829; called to the bar in 1849, and the next year made solicitor-general of Oaxaca. He was appointed judge of the Oaxaca court in 1859, and of the circuit court in 1860. He was secretary of legation at Washington from 1863 to 1866, and *chargé d'affaires* from 1867 to 1868. In the latter year, Juarez made him minister of justice; in 1869 he came to the United States as envoy extraordinary; and 1871–72 he was Mexican secretary of state. In 1872 he was once more appointed minister to this country, where he remained till the Diaz revolution in 1877.

MARIT'ZA (the anc. *Hebrus*), a river of European Turkey, rises in the Balkans, and flows e.s.e. through the province of eastern Roumelia to Adrianople, where it bends s., and falls into the Ægean by the gulf of Enos. It is upwards of 300 m. in length, and is navigable to Adrianople, about 100 m. from its mouth.

MARIU'POL, or MARIAMPOL, a seaport in the government of Ekaterinoslav, Russia, is situated near the place where the Kalmius falls into the sea of Azov, 60 m. w. of Taganrog. It was founded in 1779 by Greek emigrants from the Crimea, and the port was opened to foreign vessels in 1836, when 20 ships entered it; but afterwards their number increased to more than 300. The articles of export are wheat, linseed, wool, and hides from the adjacent provinces, the value being about £500,000. The imports are insignificant, ships most commonly arriving in ballast. Pop. '67, 7,760, who speak a corrupt jargon derived from the Turkish and Greek languages.

MARIUS, C., a Roman general, was born of an obscure family, at the village of Cereatæ, near Arpinum, 157 B.C. In the Numantine war (134 B.C.) he served with great distinction under the younger Scipio Africanus, who treated him with high consideration, and even indicated that he thought him a fit successor to himself. In 119 B.C. he was elected tribune of the plebs, and signalized himself by his vigorous opposition to the nobles, by whom he was intensely hated. In 114 B.C. he went to Spain as proprætor, and cleared the country of the robbers who infested it. He now married Julia, the aunt of Julius Cæsar. He accompanied Q. Cæcilius Metellus to Africa in 109 B.C., was elected consul 2 years after, and intrusted with the conduct of the Jugurthan war, which he brought to a successful close in the beginning of 106 B.C. From

this period dates the jealousy between him and L. Sulla, then his quæstor, which was ultimately productive or so many horrors. Meanwhile, an immense horde of Cimbri, Teutones, and other northern barbarians, had burst into Gaul, and repeatedly defeated the Roman forces with great slaughter. Marius was again called to the consulate for the year 104 B.C., and for the third, fourth, and fifth time in the following years, 103-101 B.C., for it was felt that he alone could save the republic. The war against the Teutones in Transalpine Gaul occupied him for more than 2 years; but he finally annihilated them in a battle of 2 days' duration at Aquæ Sextiæ, now Aix, in Provence, where 200,000—according to others, 100,000—Teutones were slain. After this he assumed the chief command in the n. of Italy against the Cimbri (q.v.), whom he also overthrow, near Vecellæ to the w. of Milan, with a like destruction (101 B.C.). The people of Rome knew no bounds to their joy. Marius was declared the savior of the state, the third founder of Rome, and his name was mentioned along with those of the gods at banquets. He was made consul for the sixth time in 100 B.C. It has often been remarked that, had he died at this period, he would have left behind him one of the greatest reputations in Roman history. When Sulla, as consul, was intrusted with the conduct of the Mithridatic war, Marius, who had long manifested an insane jealousy of his patrician rival, attempted to deprive him of the command, and a civil war began (88 B.C.). Marius was soon forced to flee, and after enduring the most frightful hardships, and making numerous hairbreadth escapes, he reached Africa, where he remained until a rising of his friends took place under Cinna. He then hurried back to Italy, and, along with Cinna, marched against Rome, which was obliged to yield. Marius was delirious in his revenge upon the aristocracy; a band of 4,000 slaves carried on the work of murder for 5 days and nights. Marius and Cinna were elected consuls together for the year 86 B.C., but the former died after he had held the office 17 days.

MARIVAUX, PIERRE CARLET DE CHAMBLAIN DE, 1688–1763; b. Paris. He wrote many comedies, mostly for the Italian theater, but they are not now performed. The best are *Le jeu de l'Amour et du Hasard*, and *Les Fausses Confidences*. He wrote also the romances *La viè de Mariane*, and *Le Paysan Parvenu*. He was elected a member of the French academy in 1743.

MAR'JORAM, *Origanum*, a genus of plants of the natural order *labiatæ*, having a 10-ribbed, 5-toothed calyx, loose spikes, and broad bracts. The species are annual, perennial, and shrubby plants, natives chiefly of the east, and of the countries bordering on the Mediterranean. They abound in a yellow essential oil—*oil of marjoram* or *oil of origanum*—which is obtained from some of the species by distillation. The COMMON MARJORAM (*O. vulgare*) is the only species found in Britain, and is not unfrequent in dry hilly and bushy places. It is a perennial plant, has a stem 1 foot high, ovate leaves, and roundish, panicled, crowded heads of purple flowers, with large bracts. It is used, as are also other species, as a seasoning in cookery, and an infusion of it is a stimulant, tonic, and remedy for nervousness. The powder is an errhine. The essential oil is used as a palliative of toothache, and is mixed with olive oil, to make a stimulating liniment, which is used as a remedy for baldness and in rheumatic complaints, and in cases of sprains and bruises.—The SWEET MARJORAM of our gardens (*O. majorana*) is an annual plant, a native of Greece and the east, with ovate grayish-green leaves, covered on both sides with a thin down, about 3 roundish heads of flowers growing close together, wrinkled bracts, and small white flowers. Its uses are similar to those of the common marjoram.

MARK, the standard weight of the money system of various countries of Europe. In Germany, during the Carlovingian period, a pound-weight (the Roman pound of 12 oz., which had been adopted as the standard of weight by the Frankish kings) of pure silver was coined into 240 pennies (*denarii*), so that a pound of money, or 240 silver pennies, actually weighed a pound. But in the course of time the coin having become debased, a new standard was found necessary, and as 240 of the pennies then commonly contained about half a Cologne pound of pure silver, it was agreed to accept this as the standard. The Cologne pound was divided into 32 oz., and the half-pound of 16 oz. had been known by the name of a *mark* as early at least as 1042; and thus the mark of 16 Cologne oz. of pure silver, equivalent to 7 oz. 14 dwt. 14 gr. English, and now coined into 14 thalers, has come to be the fundamental standard of reference. In France the mark was divided into 8 ounces=64 drams=192 deniers or pennyweights=4608 grains. The mark of Holland is the same as that of France. The pound or *livre poids de marc* used in all retail dealings in France prior to the revolution, was equivalent to 2 marks or 16 oz., or rather more than half a kilogram of modern French weight. The name mark was also given to a coin once current in England, in value 13s. 4d. The value of the Scotch mark was 13⅓d. sterling. The mark formerly in use in Hamburg was worth 1s. 2½d. sterling; the mark banco, in which accounts were kept, 1s. 5¾d. In the new uniform currency of the German empire, the unit of reckoning is the mark, approximately equal to 1s.

MARK, a German geographical term, signified primarily the *mark* of a country's limits (the *march*); and hence was applied as a designation of the border countries or districts of the German empire, conquered from neighboring nations. Thus, we read of the marks of Austria, of Northern Saxony or Brandenburg, Lausatia, Moravia,

Steiermark, etc. Tho governors intrusted with the charge of these border districts, or *marks*, were called *mark-grafs*, corresponding to the English and Scottish *wardens of the marches*. See MARQUIS.

MARK the Evangelist is probably the same who, in the Acts of the Apostles, is called John Mark. He came originally from Jerusalem, was a nephew of Barnabas, and accompanied the apostle Paul and him to Antioch, Cyprus, and Perga in Pamphylia, returned to Jerusalem, and went afterwards to Cyprus, and thence to Rome (see Acts xiii.; Col. iv. 10; 2 Tim. iv. 11). Ecclesiastical tradition speaks of a missionary expedition of Mark to Egypt and the west of Africa, of his suffering martyrdom about the year 62 or 66 (the Coptic church still consider him their founder and first bishop), and of the transmission of his corpse to Venice, which city has chosen him for its patron saint. The festival (April 25) which the Roman Catholic church holds in his honor is no older than the close of the 7th century. The canonical gospel which passes under his name is believed by some scholars to have sprung from a primitive collection of notices of the life and acts of Christ, drawn up by Mark, and to have been worked up into its present form by a later writer, who had before him the gospels of Matthew and Luke. Others, on the contrary, are of opinion that in Mark's work we have the primitive gospel from which the rest have orignated. Compare Wilke, *Der Urevangelist* (Dresd. and Leip. 1838), and Baur, *Das Marcusevangelium* (Tüb. 1851). See GOSPELS.

MARK THE EVANGELIST (*ante*), called "John whose surname was Mark," and simply "John" in the earlier parts of the Acts, but in a subsequent passage and in the epistles "Mark" only; was, perhaps, a native of Jerusalem, as his mother lived there in the first days of the church; probably became a disciple under Peter's ministry, as Peter calls him his "son;" was a companion of Paul and Barnabas as far as Perga in Pamphylia, where he left them and returned to Jerusalem. When they were about to start the second time Barnabas was resolute in his purpose to take Mark with them, but Paul thought that it was not proper to have with them one who had once before left them in the midst of the work. This difference of opinion on a matter so vital produced a sharp contention between the zealous co-laborers and friends which resulted in a division of their work, Barnabas taking Mark with him to Cyprus, and Paul, with Silas as his companion, going by land through Syria and Cilicia and thence to the west. Nearly all the information concerning Mark which the Scriptures after this supply is found in Paul's epistles in which the apostle's references to the evangelist are highly honorable to both. Paul may have thought, on subsequent reflection, that he had been hasty in his judgment, or, as is more probable, Mark's steadfastness of character may have been increased by experience and especially by the remarkable dispute and separation to which his earlier conduct had given rise. One thing is certain, that Paul's notices of him are all nobly commendatory. To Philemon he ranks him with Luke among his fellow-laborers, words which from Paul mean much; to the Colossians he sends the salutation of Marcus's sister's son to Barnabas, adding the significant parenthesis—"touching whom ye received commandments, if he come unto you, receive him;" and to Timothy among the last recorded words before his martyrdom, after telling him to use diligence in coming quickly unto him, he says, "Take Mark and bring him with yourself, for he is very profitable to me in the ministry." While the New Testament thus describes Mark as, during different portions of his life, a companion of Paul, Peter speaks of him as, probably at an intermediate time, present with him when he wrote his first epistle. By the earliest Christian writers after the apostolic age he is described as the companion of Peter rather than of Paul.

MARK, GOSPEL OF (*ante*), was received in the earliest times by the Christian churches as canonical, and as the work of Mark, under the guidance of the apostle Peter. The first written declaration to the effect, now extant, is recorded by Eusebius as quoted by Papias from John the presbyter, who probably was contemporary with John the apostle. "Mark having become Peter's interpreter wrote accurately all that he remembered, but did not record the words and deeds of Christ in order; for he was neither a hearer nor a follower of our Lord, but afterwards, as I said, became a follower of Peter, who used to adapt his instruction to the requirements of his hearers, but not as making a connected arrangement of our Lord's discourses; Mark, therefore, committed no error in writing down particulars as he remembered them, for he made one thing his object—to omit nothing of what he heard and to make no erroneous statement." Without committing ourselves to all the details of this statement, two facts we may consider as established by it: first, that Mark's gospel was in general use among the churches at the close of the 1st c.; and second, that in writing it he was in a greater or less degree under Peter's guidance, so that the second gospel may be regarded as having received his sanction to the same extent, at least, that the third was approved by Paul. While nearly all the facts which it records are given also in one or more of the other gospels, Mark's shorter gospel abounds in word-painting and precise descriptions which imply that at some stage of the narrative an eye-witness had furnished the writer with particulars which otherwise he could not have known. In one instance, while Matthew says Jesus "stretched forth his hand towards his disciples," Mark's description is, "Looking around on the circle of those who were seated about him." Where Matthew says, "He turned and said unto Peter," Mark's account is, "When he had turned about and looked on his

disciples, he rebuked Peter." In the account which three evangelists give of the rich young man who came to Jesus, only Mark adds, "Jesus looking earnestly on him loved him." In narrating the healing of the withered hand on the Sabbath day, while Luke says, "Looking around on them all," Mark says, "Looking around on them with anger, being grieved for the hardness of their hearts." Matthew describes the demoniacs of Gadara as "exceeding fierce, so that no man could pass by the way:" Luke says of one of them that "often times the spirit had caught him, and he was kept bound with chains and in fetters, and he brake the bands and was driven by the demon into the wilderness." Mark's account is the most picturesque of all, "No man could bind him, no, not with chains; because that he had been often bound with fetters and chains, and the chains had been plucked asunder by him, and the fetters broken in pieces; neither was any man strong enough to restrain him; and always, night and day, he was in the mountains, and in the tombs, crying and cutting himself with stones." Matthew and John were eye-witnesses, and had personal knowledge in other ways, of what they narrate; Luke's narrative in some parts gives information that he had probably obtained from Mary and from historical records; and when Mark relates so many particulars which imply the presence of an eye-witness from the beginning, the testimony of the early church is confirmed that that eye witness was Peter. In two instances, the probability rises almost to certainty: while Matthew gives Peter's confession in full, "Thou art the Christ, the son of the living God," followed by the benediction which it drew from Jesus, "Blessed art thou, Simon Barjona, for flesh and blood hath not revealed it unto thee, but my Father, who is in heaven," and by the remarkable promises as well as stern rebuke to which we can here only refer, Mark gives the confession only in the briefest form, "Thou art the Christ," and, omitting all intimation of benediction and promises, records the rebuke in its full force. Again, while the other gospels all speak in general terms of the cock-crowing in connection with Peter's denial, Mark specifies the crowing twice, both in the Savior's prediction and in the progress of the denial itself. In both these instances we seem warranted in saying that it was Peter, who dictated in the narrative these striking discriminations against himself.

Synopsis of Contents.—Omitting all notice of the birth and minority of Jesus and recording briefly the ministry of John the Baptist, Mark introduces Jesus at his baptism, followed by the descent of the Holy Spirit upon him, with the voice from heaven, and by the temptation in the wilderness. He then begins the account of his public ministry at the imprisonment of John; narrates the call of Simon and Andrew and of James and John; the mighty works wrought in Capernaum, followed by the circuit in Galilee; the forgiveness of the paralytic, attested by his restoration to health; the calling of Levi, followed by the entertainment at his house where many publicans and sinners were guests; the disciples in the corn-fields and the authority claimed by Jesus over the Sabbath day; the withered hand restored on the Sabbath; the multitudes drawn to Jesus from all parts of Palestine, Idumea, and Syria; the choice of the 12 apostles; the effort of the mother and brethren of Jesus to restrain him; the parable of the sower; the emblems of the lighted candle, of the seed sown, and of the grain of mustard seed; the stilling of the storm on the lake; the legion of demons that, cast out of the man, entered into the swine; the woman healed, and the daughter of Jairus raised up; the preaching at Nazareth, and unbelief of the people there; the twelve instructed, empowered, and sent forth, two by two; the perplexity of Herod, explained by a full narrative of his having put John the Baptist to death; the return and report of the twelve; the feeding of 5,000 men with five loaves, followed by the walking on the sea, and by the multitude of the sick brought together from all the region around and healed; the traditions of the elders condemned as making void the commandments of God, and counter-instructions concerning true religion given; the Syrophenician mother, at first apparently rejected in order to manifest her faith, rewarded by finding her daughter restored; the deaf stammerer cured; the 4,000 fed with seven loaves; warning against hypocrisy under the emblem of leaven; a blind man led out of the town and healed; Peter's confession of faith, followed by his presumption and stern rebuke; the disciples warned concerning future trials; the transfiguration and instructions connected with it; the dumb, deaf, and desperate demon cast out; the death of the Son of man foretold; the ambition of the disciples reproved, and humility taught under the emblem of a child; John's narrow views corrected; offenses warned against under the emblems of a hand and foot to be cut off and of an eye to be plucked out; the unlawfulness of divorce declared; little children blessed; the rich inquirer concerning eternal life; the disciples amazed and afraid; the ambitious request of James and John; Bartimæus restored to sight; the entrance into Jerusalem; the fig-tree dried up, and instructions afterwards drawn from it; the temple cleansed, and the subsequent demand for authority silenced; the hypocritical question of the Pharisees and Herodians, the scoffing question of the Sadducees, the earnest question of the scribe, and the silencing question of Jesus; warning against the scribes; the offerings of rich men and of the poor widow compared; the destruction of the temple foretold, with the attending tribulations and the sudden coming of the Son of man; the conspiring of the chief priests and scribes; the broken box of ointment, and the prediction concerning it; the covenant of Judas with the chief priests; the passover kept, the supper instituted, the betrayal and Peter's denial foretold; the conflict in Gethsemane; the betrayal, apprehension, denial by Peter, condemnation by the council, and accusa-

tion before Pilate; Barabbas released, and Jesus scourged and crucified; scenes at the cross and at the tomb; resurrection, attested by appearances to the disciples; commission and promise to the apostles; the ascension of Jesus, followed by the successful preaching of the apostles everywhere in his name. The last 12 verses of the xvi. chapter are not found in two of the oldest and best manuscripts, and their genuineness has, therefore, been questioned; but their genuineness is claimed as fully proved by the quotations from them by Irenæus and other writers of the 2d c., whose testimony is much older than any manuscript extant.

MARK ANTONY. See ANTONIUS, *ante*.

MARKET OVERT, a term in English law, used to denote an open market. If stolen goods are sold in open market without fraud on the part of the buyer, the real owner cannot reclaim them from such purchaser till he has prosecuted the thief.—In Scotland, the real owner can reclaim the goods at any time, whether in the meantime sold in open market or not.

MARKETS. See FAIRS.

MARKHAM, CLEMENTS ROBERT, b. England, 1830; educated at Westminster, and appointed a naval cadet in 1844. He was made lieut. in 1850, but left the navy the next year. He had been attached to the expedition in search of sir John Franklin in 1850–51, and from 1852 to 1854 he traveled in Peru and among the Andes. He was appointed a clerk to the board of control in 1855; introduced the cinchona plant into India in 1860; went to Ceylon and India in 1865, and in 1867 took charge of the geographical department of the India office. He went with the English expedition against Abyssinia as geographer in 1867, and was present at the capture of Magdala. He has published *Franklin's Footsteps*, 1852; *Cuzco and Lima*, 1856; *Travels in Peru and India*, 1862; *A Quichua Grammar and Dictionary*, 1863; *Spanish Irrigation*, 1867; *A History of the Abyssinian Expedition*, 1869; *A Life of the Great Lord Fairfax*, 1870; *Ollanta, a Quichua Drama*, 1871; *Memoir on the Indian Surveys*, 1871; general sketch of the *History of Persia*, 1873; *The Threshold of the Unknown Region*, 1874; *A Memoir of the Countess Chinchor*, 1875. He is secretary of the royal geographical society and editor of the *Geographical Magazine*.

MARKHAM, GERVASE, 1570–1655; b. Gotham, Nottinghamshire, England; was a capt. in the army of Charles I., and an author of great versatility, having employed his pen upon poetry, the drama, military tactics, angling, archery, etc. The most important of his works are *The Poem of Poems; Sir Richard de Grinville* (a tragedy); *The English Husbandman;* and *The Whole Art of Angling*.

MARKHAM, WILLIAM, a relative of William Penn; deputy-governor of Pennsylvania and Delaware in 1681–82; secretary of the province in 1684; deputy-governor of Delaware, 1691–93; deputy-governor of Pennsylvania under gov. Fletcher, 1693–95; and under William Penn, 1695–99.

MARKING-NUT, the fruit of *semecarpus anacardium*, a tree of the natural order *anacardiaceæ*, a native of the mountains of India. It is a large tree, with oblong leaves, and terminal panicles of flowers. The fruit is a heart-shaped nut, seated on a large swollen receptacle. The receptacle, when ripe, is roasted and eaten, and resembles a roasted apple; although, when raw, it is astringent and acrid. The nut is black, and between the two coats of its shell there is a black acrid juice, much in use for marking cotton-cloths, a mixture of quick-lime and water being applied, to prevent it from running, and to brighten the color. It is also used as an external application in rheumatism.

MARKIRCH. See SAINTE-MARIE-AUX-MINES.

MARL (Ger. *Mergel*), a mixture, naturally existing, of clay and carbonate of lime. Marls are found in very different geological formations, but everywhere seem to owe their origin to deposition by water. The name is sometimes applied to friable clays, or mixtures of clay and sand, in which there is almost no trace of lime; but the presence of a notable proportion of carbonate of lime is essential to marls, properly so called. This proportion varies from 6 to 20 per cent. Marly soils are in general of great natural fertility. Marl is very advantgeously used as a manure, acting both chemically and mechanically; but different kinds of marl are of very different value in this respect. The use of marl as a manure has been known from ancient times. An English statute of 1225 (10 Henry III.) gave every man a right to sink a marl-pit on his own ground, and there is other evidence that the application of marl to land was common in England in the 13th century. Old marl-pits are very common in some parts of England. The quicker action and greater efficiency of lime have led to its use in many cases instead of marl, although some kinds of marl are extremely useful in some soils. The bulkiness of marl confines its use to the neighborhood in which it is found.—Marl is sometimes indurated into a rock, and a slaty variety, containing much bitumen (*bituminous marl-slate*), is found in Germany and other countries.

MARL'BOROUGH, a co. in n.e. South Carolina; 500 sq.m.; pop. '80, 20,598. The surface is generally level, and there are extensive forests. The chief productions are wheat, corn, oats, rice, and cotton. Co. seat, Bennettsville.

MARLBOROUGH, a t. in Middlesex co., Mass., 32 m. w. of Boston; pop. '80, 10,126. The Boston, Clinton and Fitchburg and a branch of the Fitchburg railroads pass through it. The principal business is the manufacture of boots and shoes, which is extensive. There are 7 churches, 2 newspapers, a national and a savings bank, 3 hotels, a public library, a soldiers' monument, and a handsome town-hall.

MARLBOROUGH, an old and interesting t. of England, Wiltshire, is a municipal and parliamentary borough, pleasantly situated in the valley of the Kennet, 75 m. w.s.w. of London. It consists principally of one street of picturesque houses. The chief edifice is the "college," a handsome building occuping the site of the old castle. As early as the days of Cœur-de-Lion there was a castle at Marlborough; and a parliament, whose enactments were called the "statutes of Marlbridge," was held here in the reign of Henry III. The college was incorporated in 1845; the pupils are about 300 in number. Marlborough was formerly an important posting-station between London and Bath and Bristol. It still carries on a trade in coal, corn, and malt. Pop. '71, of parliamentary borough, which returns one member to parliament, 5,034.

MARLBOROUGH, JOHN CHURCHILL, Duke of, the greatest general and statesman of his time, was b. June 24, 1650, at Ashe, in Devonshire, of an old family impoverished by the civil wars. Without having received much education he became a page in the service of the duke of York, who gave him a commission as an ensign of guards in his 16th year. He was present at the relief of Tangiers, and a number of engagements with the Moors, and after his return to England rose to the rank of capt. in a regiment which was sent to the Netherlands to the support of the French. In the campaign from 1672 to 1677 his brilliant courage and ability gained him the praise of the celebrated Turenne. On the conclusion of the war by the peace of Nimeguen, Churchill, now a col., returned to England. His advancement had been obtained not merely on account of his own merit, but through the influence of his sister Arabella, mistress of the duke of York. His prosperity was afterwards still further secured by his marriage with Sarah Jennings, a lady as remarkable for her talents and imperious disposition as for her beauty. When James II. ascended the throne, Churchill was made baron of Sundridge, and was raised to the military rank of general. He took an active part in suppressing Monmouth's rebellion, but on the landing of the prince of Orange he passed over to the side of the invader very unscrupulously. He was rewarded by being made earl of Marlborough. He aided in reducing Ireland to subjection, and, having received from William III. the command of the troops employed against France in the Netherlands, displayed great ability as a gen. in the campaigns of 1689, 1690, and 1691. But in 1692 he fell into disfavor with the king and was dismissed from all his offices, and shortly after he was even thrown into the Tower for a few days on the charge of maintaining treasonable correspondence with the exiled king. On the commencement of the war of the Spanish succession he was intrusted with the command of the British army in the Netherlands. The death of William, and the accession of Anne to the throne in March, 1702, made Marlborough virtually regent, although without the title. His wife governed the queen, and he himself directed the minister Godolphin, whose son had married his daughter. A constant succession of victories strengthened his political power. In the campaign of 1702 he drove the French out of Spanish Guelders, in reward for which service the queen raised him to the rank of duke; and in 1703 he campaigned again in the Low Countries. In 1704 he went to the support of the emperor in Germany, and joined prince Eugene of Savoy; in July, 1704, he stormed the French and Bavarian lines at Donauwörth; and on Aug. 13 overthrew a stronger French and Bavarian army in the memorable and decisive battle of Blenheim. The parliament bestowed on him the estate of Woodstock, and the queen caused Blenheim palace to be built for him, though it had to be finished at his own expense. In 1705 Marlborough was made a prince of the empire. During the year 1705 Marlborough was chiefly occupied with diplomatic negotiations, but in 1706 he resumed that career of victory by which Louis XIV. was so completely humbled. In May of that year the battle of Ramillies was fought, which compelled the French to evacuate the whole of Spanish Flanders. In the summer of 1708 an attempt made by the French, under Vendome, to recover Flanders, brought on an engagement at Oudenarde, July 11, which resulted in the total defeat of the French. On Sept. 11, 1709, he fought the bloody and unprofitable battle of Malplaquet; in 1710, his final campaign, he took town after town from the French. Meanwhile, however, important events took place at the British court: the queen shook off the tyranny of the duchess of Marlborough, which had become intolerable to her; Godolphin and Sunderland ceased to be ministers, and the earl of Oxford and the tories came into power. Marlborough was accused of having embezzled the public money, and on Jan. 1, 1712, he was deprived of his offices, but the charge against him was not prosecuted. On the accession of George I. he was treated with distinction and made capt.gen. and master of the ordnance. But on May 28, 1716, he had a stroke of apoplexy. This, though it slightly impaired his speech, did not prevent him from continuing to sit in parliament and attending to his other duties till six months before his death, which happened on June 16, 1722. He left an immense fortune. Marlborough was unquestionably guilty of political dissimulation, was inordinately fond of money, and may have been parsi-

monious. But his character had many elements of singular excellence. He was generous in action, gentle in temper, a devoted husband, and a pious Christian.

His wife, Sarah Jennings, was b. on May 29, 1660, and when about 12 years of age came into the service of the duchess of York, and became the chosen and most intimate friend of the princess Anne, over whom, after her accession to the throne, she exercised the influence due to a superior and extremely active mind. Her power was almost boundless; the whig ministry depended upon her support, and she disposed of places and offices at her pleasure, and is even said to have accumulated money by the sale of them. Her rule became, however, at last intolerable to the queen, in whose favor her own cousin, lady Masham, whom she herself had brought to court, supplanted her. She retired from the court in January, 1711. She long survived her husband, living in complete retirement, and died on Oct. 29, 1744, leaving a fortune of £3,000,000 sterling. The only son of the duke and duchess of Marlborough died young, and the title has been inherited by the descendants of one of their daughters.

MARLINE-SPIKE, a ponderous iron pin, with a large head and taper point, used on shipboard for separating the strands of rope preparatory to splicing or knotting; also employed as a lever in tightening rigging, etc.

MARLOW, GREAT. See GREAT MARLOW.

MARLOWE, CHRISTOPHER, familiarly *Kit*, an English dramatic writer, was b., it is supposed, in 1565. But little is known of the events of his life. He studied at Corpus Christi college, Cambridge, and took the degree of master of arts in 1587. After leaving the university, he came up to London, and wrote for the stage. His chief works are *Dr. Faustus, Edward II., Tamburlaine the Great*, and two cantos of *Hero and Leander*, a narrative poem which was afterwards completed by Chapman. He appears to have led a reckless life; and on June 1, 1593, he perished in a tavern brawl, it is supposed by the hand of a jealous rival.

Of all the dramatic writers before Shakespeare, he was the greatest genius; indeed, his *Edward II.* may be considered a foreshadow of Shakespeare's historical dramas. His "mighty line" has been the subject of much critical laudation. His imaginative force and splendor are at their best in *Faustus;* his delicacy and sweetness in *Hero and Leander*. An edition of his works, with a life and a literary-historical introduction, was published by Dyce in 1850.

MAR'MALADE (Port. *marmelada*, from *marmelo*, a quince; which, again, is from Mid. Lat. *malomellum*, Gr. *melimelon*, honey-apple or sweet apple) is a semi-liquid preserve, made by boiling the pulp of thick-rinded fruits, such as oranges, pine-apples, quinces, etc., with portions of the rind. The most common kind of marmalade is made from the bitter or Seville oranges, the common or sweet sorts being considered inferior for this purpose, though also occasionally used. The mode of preparing it is generally as follows: the rind is boiled by itself, and the white woolly coating on the interior being then removed, the rind is cut up into thin strips, and boiled along with the expressed juice of the pulp and a quantity of sugar equal in weight to the other ingredients. After the mixture has attained the proper consistence, it is treated in a similar manner to jam, jelly, and other preserves. A species of marmalade is commonly made in France from apricots, peaches, plums, pears, etc.

MARMANDE, an old t. of France, in the department of Lot-et-Garonne, on the right bank of the Garonne, 50 m. above Bordeaux. An important general trade is carried on with Bordeaux, with which Marmande is in daily communication by steamboat. Pop. '76, 6,037, who manufacture hats, woolen stuffs, brandy, etc.

MAR'MAROS, the name of a co. in n.e. Hungary, bounded on the n. by Gallicia, e. by Gallicia and Bukowina, and s. by Transylvania. It is the third county in size in Hungary; 3,998 sq.m.; pop. '70, 220,506. The population is made up of Wallachs, Jews, Magyars, Germans, and Ruthenians, the latter being fully half the whole number. The prevailing church is the united Greek. It is a mountainous region, being crossed and intersected by the Carpathian chain, many of whose peaks reach a great height. It is a rich mineral country, containing iron, lead, coal, and gold; there are also great salt mines, alabaster, marble, crystals, and diamonds. Mineral springs are frequent, the land is heavily timbered, chiefly with oak; and there are vast numbers of horses and sheep. The river Theiss waters this county, and its valley is fertile, and produces grain, fruits, and wine; elsewhere maize is the only important food product.

MARMIER, XAVIER, b. in Pontarlier, France, 1809. After journeys through Europe he translated Krummacher's stories from the German into French, and their success enabled him to make further travels and to become director of the *Revue Germanique*. In 1835 he was attached to the scientific voyage of the *Recherche* to the Arctic sea. During the voyage he acquired a knowledge of the Danish, Swedish, and Finnish languages; and on his return in 1839 was made professor of foreign literature at Rennes, and two years later was given a sinecure under the minister of public instruction. In 1842 he visited Russia; traversed the Indies, passing from the Danube to the Nile; in Syria in 1845; Algeria in 1846; North America in 1848; South America, 1849, etc.; everywhere studying the languages, idioms, and literature of the country. His works are numerous,

and valued as a fund of information for students of the languages and manners of all the people among whom he has been—for he has written continuously as he traveled.

MARMONT, AUGUSTE FRÉDÉRIC LOUIS VIESSE DE, duke of Ragusa and marshal of France, was b. July 20, 1774, at Châtillon-sur-Seine, entered the army at an early age, served as a brig.-gen. in Egypt, returned with Bonaparte to France, supported him in the revolution of the 18th Brumaire, and afterwards continued in active military service. Having defended the Ragusan territory against the Russians and Montenegrins, he was made duke of Ragusa. He joined the great army in 1809, the day before the battle of Wagram, was intrusted with the pursuit of the enemy, won the battle of Znaym, and was made a marshal. He was thereafter for eighteen months governor of the Illyrian provinces; and in 1811 succeeded Massena in the chief command in Portugal, where he assumed the offensive, caused the siege of Badajoz to be raised, and kept Wellington in check for fifteen months. A wound compelled him to retire to France. In 1813 he commanded a *corps d'armée*, and fought at Lützen, Bautzen, and Dresden. He maintained the contest with great spirit in France in the beginning of 1814; and it was not until further resistance was hopeless that he concluded a truce with Barclay de Tolly, on which Napoleon found himself compelled to abdicate. The Bourbons loaded Marmont with honors. On the return of Napoleon from Elba, he was obliged to flee. After the second restoration, he spent much of his time in agricultural pursuits, till the revolution of 1830, when, at the head of a body of troops, he endeavored to reduce Paris to submission, and finally retreating with 6,000 Swiss, and a few battalions that had continued faithful to Charles X., conducted him across the frontier. From that time he resided chiefly in Vienna. In 1852 he engaged in an effort for the fusion of the French legitimists and Orleanists, but died at Venice on Mar. 2 of that year. He was the last survivor of the marshals of the first French empire.

MARMONTEL, JEAN FRANÇOIS, an elegant French writer, b. of an obscure family at Bort, in the Limousin, July 11, 1723. He studied for the church, but turned aside to literature, and after obtaining some reputation in Toulouse as a poet, he went to Paris on an invitation from Voltaire in 1746. Here he wrote tragedies and operas without any great success, but was fortunate enough to get a secretaryship at Versailles, through the influence of Mme. Pompadour, in 1753. Afterwards, he received a more lucrative appointment, the *Mercure* being intrusted to his charge. His *Contes Moraux* (2 vols., Par. 1761), part of which originally appeared in the *Mercure*, have been translated into many languages, but are in some measure liable to the charge of monotony. He wrote other works, the most celebrated of which is his *Bélisaire*, a political romance, containing a chapter on *toleration*, which excited the most furious hostility on the part of the doctors of the Sorbonne. The book was condemned as "heretical and blasphemous." The clergy declaimed against it from the pulpits; the city was in a ferment; even the wise Turgot was borne away by the current. Pamphlets, epigrams, caricatures appeared in great numbers. There was a dead set-to between the philosophers and wits on the one hand, and the theologians on the other; but the latter were defeated, and Marmontel was named historiographer of France. In 1787 appeared his *Elémens de Littérature*, consisting of his contributions to the *Encyclopédia*, in which he had charge of the departments of poetry and general literature. It is really his best book, and the one on which his reputation most securely rests. After the revolution, he retired to the village of Abloville, near Evreux, where he died, Dec. 31, 1799. An edition of his *Œuvres Complètes* was published by himself in 17 vols.; another 18 vols. (Par. 1818); a third, 7 vols. (Par. 1819–20).

MAR'MORA, THE SEA OF, the *Propontis* of the ancients, a small sea between European and Asiatic Turkey, communicating with the Ægean sea by the strait of the Dardanelles (anciently *Hellespont*), and with the Black sea by the strait of Constantinople (anciently *Bosporus*). It is of an oval form, and about 135 m. in length by 45 in breadth, but has besides a large gulf, the gulf of Isnikmid or Ismid, which extends about 30 m. eastwards into Asia. The depth is great. There is a current from the Bosporus through it and the Hellespont to the Archipelago; but its navigation is by no means difficult. It contains many islands, of which the largest is Marmora or Marmara, famous for its quarries of marble and alabaster. The scenery around the sea of Marmora is soft and beautiful.

MAR'MOSET, a name often given to a number of small and beautiful species of American monkeys of the genera *hapale* and *jacchus*, also called OUISTITI, and sometimes also to species of the genus *midas* of naturalists. They are all distinguished from the other American monkeys by the smaller number of their grinders, resembling in this the monkeys of the old world, also by the sharpness and crookedness of their nails. They depart from the true quadrumanous character in having the thumb not opposable. The tail is very long, and thickly covered with hair, but not prehensile. They exhibit a very affectionate disposition; but unhappily all of them prove very delicate when removed from a warm climate. The name Marmoset is sometimes restricted to the species also called the STRIATED MONKEY, or STRIATED OUISTITI (*hapale jacchus*, or *jacchus vulgaris*), a native of Guiana and Brazil, a species often brought to Europe, and a favorite pet whenever it can be obtained. It is about seven or eight inches long, exclusive of the tail, which measures a foot. Its fur is long and soft, of a fine dark gray or reddish-yellow color, banded with black; a long tuft of white hairs on each side of the black head.

MARMOT, *Arctomys*, a genus of rodents, usually ranked among the *muridæ*, but regarded as forming a connecting link between that family and *sciuridæ;* resembling squirrels in their dentition, although in their form and habits they more resemble rats and mice. They have two incisors and two premolars in each jaw, four molars on each side above, and three below. The COMMON MARMOT, or ALPINE MARMOT (*A. alpinus*), is a native of the Alps, the Pyrenees, and the more northern mountains of Europe, up to the limits of perpetual snow. It is not a native of Britain. It is about the size of a rabbit, grayish yellow, brown towards the head. It feeds on roots, leaves, insects, etc. It is gregarious, and often lives in large societies. It digs large burrows with several chambers and two entrances, generally on the slopes of the mountains, where the marmots may be seen sporting and basking in the sunshine during the fine weather of summer. They spend the winter in their burrows, in one chamber of which is a store of dried grass; but the greater part of the winter is passed in torpidity. The alpine marmot is easily tamed. The QUEBEC MARMOT (*A. empetra*), found in Canada and the more northern parts of America, in woody districts, is a burrowing but not a gregarious animal.

MARNE, a river of France, the *Matrŏna* of the ancients, the most considerable tributary of the Seine, on the right. It rises in the plateau of Langres, flows through the departments of Haute-Marne, Marne, Aisne, and Seine-et-Marne, in a course at first to the n.w., and then to the w., with many windings; passes Chaumont, Joinville, St. Dizier, Vitry, Châlons, Epernay, Château-Thierry, and Meaux; and joins the Seine at Charenton, about four miles above Paris. Its length is about 205 m.; and it is navigable for 140 miles. It is rather a rapid stream, and in most places with a wide bed. The commerce carried on upon this river has been extended by means of canals, of which the most important is one completed in 1851, connecting it with the Rhine.

MARNE, an inland department in the n.e. of France, formed out of the old province of Champagne, is traversed by the river Marne, and extends southward from the frontier department of Ardennes. Area, 2,021,488 English acres, of which 1,519,320 acres are cultivable, and 45,704 are in vineyards. Pop. '76, 407,780. The soil is very fertile in the s., but chalky and arid in the north. It is in the dry and chalky soil of the n. of this department where the best varieties of the famous champagne wine (q.v.) are grown. In 1875, 15,318,345 bottles of champagne were exported. Of wines of all kinds, about 15,400,000 gallons are produced annually. The rearing of a Spanish breed of sheep is a chief industry, and woolen manufactures are largely carried on. The department is divided into the 5 arrondisements of Châlons-sur-Marne, Epernay, Reims, Sainte-Ménéhould, Vitry-le-François. Capital, Châlons-sur-Marne.

MARNE, HAUTE, an inland department in the n.e. of France, s.e. of the department of Marne. Area, 1,545,460 acres; pop. '76, 252,448. The surface is generally hilly, and is mountainous in the s. and east. More than one-half of it is cultivable, and about one-third is in forests. The principal rivers are the Marne, with its tributaries, and the Meuse. About 13,000,000 gallons of wine of an ordinary quality are produced. The department is rich in iron ore; there are numerous furnaces, and the production of iron is the principal branch of industry. There are three arrondissements, of Chaumont, Langres, and Vassy; capital, Chaumont-en-Bassigny.

MARNIX, PHILIP VAN. See ALDEGONDE, SAINTE.

MAROCCO. See MOROCCO.

MAROCHETTI, CARLO, Baron, chevalier of the legion of honor, an Italian sculptor of merit, b. at Turin in 1805. Having completed his primary studies at the lyceum Napoléon, he entered Bosio's study. On the completion of a tour through Italy he took up his abode in France in 1827, and carried off a medal the same year for his beautiful statue of "A Young Girl sporting with a Dog." In 1831 he exhibited the "Fallen Angel." On the outbreak of the Paris revolution of 1848, Marochetti repaired to London, where he continued to reside, having met with splendid encouragement both from the public and a host of royal and noble patrons. Among his best works are an equestrian statue of Emmanuel Philibert, executed gratuitously for the city of Turin; the tomb of Bellini, in Père la Chaise; the grand altar in the Madeleine at Paris; statues of the emperor, the duke of Orleans, and queen Victoria; the colossal figure of Richard cœur-de-lion, exhibited at the portal of the Crystal palace. One of his last works was a statue of lord Clyde in Waterloo place, London. He died in 1867.

MAR'ONITES, a Christian tribe of Syria, of very ancient origin, regarding which considerable controversy has arisen. The most probable account represents them as descendants of a remnant of the Monothelite sect (see MONOTHELISM) who, fleeing from the repressive measures of the emperor Anastasius II,, in the early part of the 8th c., settled on the slopes of the Lebanon, their chief seats being around the monastery of Maron, a saint of the 5th c., whose life is found in Theodoret's *Religious Histories* (iii. p. 1222). The emigrants are said to have elected as their chief and patriarch a monk of the same name, with the title of patriarch of Antioch, and, throughout the political vicissitudes of the succeeding centuries, to have maintained themselves in a certain independence among the Moslem conquerors. In the 12th c., on the establishment of the Latin kingdom of Jerusalem, the Maronites abandoned their distinctive monothelite opinions,

and recognized the authority of the Roman church. Again, in the council of Florence, 1445, they entered into a formal act of union with Rome. In 1584 a college was founded in Rome for the education of the Maronite clergy; and in 1736 they formally subscribed the decrees of the council of Trent. Nevertheless, although united with Rome, they are permitted to retain their distinctive national rites and usages. They administer communion in both kinds; they use the ancient Syriac language in their liturgy; their clergy, if married before ordination, are permitted to retain their wives; and they have many festivals and saints not recognized in the Roman calendar. The Maronites at present are about 150,000 in number, distributed into 150 parishes. Their patriarch is still styled patriarch of Antioch, and resides in the convent of Canobin on the Lebanon. He acknowledges the supremacy of the pope, and is bound to lay before him every tenth year a report of the state of his patriarchate. Under him are 17 bishops, to whom are subject the officiating clergy of the 150 districts alluded to above. The revenues of all orders of ecclesiastics, however, are very narrow, and the inferior clergy live in great measure by the labor of their hands. Very many convents for both sexes are spread over the country, containing, in the whole, from 20,000 to 25,000 members, who all wear a distinctive costume, but follow the rule of St. Anthony. The chief seat of the Maronites is the district called Kesrawan, on the western declivity of Mount Lebanon; but they are to be found scattered over the whole territory of the Lebanon, and in all the towns and larger villages towards the n. in the direction of Aleppo, and southwards as far as Nazareth. Their political constitution is a kind of military republic, regulated for the most part by ancient usages and by unwritten, but well-recognized laws. Like the Arabs of Syria, they have a political hierarchy, partly hereditary, partly elective. The chief administration is vested in four superior sheiks, who possess a sort of patriarchal authority, and under these are subordinate chiefs, with whom, as in the feudal system, the people hold a military tenure. They retain even still a custom similar to that of the Sardinian *vendetta*, by which the kindred of the slain are bound to avenge his death. The relations of the Maronites with the Druses have been already detailed. See DRUSES By an arrangement adopted since the recent sanguinary conflicts, both populations alike are subject to one governor, who is appointed by the porte as governor of the Lebanon.

MAROONS, a name given in Jamaica and Dutch Guiana to runaway negro slaves. The term was first applied to those slaves who were deserted by their masters, the Spaniards, when the British conquered Jamaica (1655), and who took refuge in the uplands, where for 140 years they maintained a constant warfare with the British colonists; but in 1795 they were subdued, and a portion of them removed to Nova Scotia, and afterwards to Sierra Leone. The remnant fraternized with their manumitted brethren in 1834–35. The Maroons of Dutch Guiana form a number of small independent communities.

MAROS' RIVER, in the Austro-Hungarian empire, takes its rise in the Carpathian mountains of Transylvania, near Mt. Magos; flowing s.w. through Transylvania it enters Hungary, where it forms the n. boundary of the Banat or military frontiers. It empties into the Theiss; length 350 miles. On the left side its principal branches are the Nyarad, Kokel, Sebes, and Strehl; on the right, the Aranyos. In its upper portion it flows through a country rich in almost all the metals and minerals; its lower course is through fertile plains. It is navigable as far as Karlsburg, which is the principal city upon its banks.

MAROS-VASARHE'LY, a market t. of Austria, in Transylvania, in a fruitful district, on the Maros, 55 m. n.n.e. of Hermanstadt. It contains a strong castle, a beautiful Gothic church (Reformed), and a public library of 60,000 vols. Tobacco, wine, and fruit are extensively grown. Pop. '69, 12,678.

MAROT, CLÉMENT, 1495–1544; b. in Cahors, France; studied law, found it repugnant, attracted the attention of Marguerite de Valois, and was made valet de chambre to Francis I. His father was court poet of Anne of Bretagne, and had also been valet de chambre of the same king. Marot's wit, poetic faculty and charming manners secured the favor of the monarch, to whom he had dedicated a poem, the *Temple of Cupid.* At the battle of Pavia, in Italy, he was taken prisoner with Francis I. Returning to France not long after, he was imprisoned for supposed sympathy with the reformers in religion, suggested by his poem *L'Enfer.* Released by his friend, the bishop of Chartres, his pen became more lively and caustic than before, as will be seen by the following verse from *L'Épitre aux Dames de Paris:*

L'oisiveté des moines et cagots,
Je la diraes, mais je crains les fagots;
Et des abus dont l'église est fourée,
J'eu parlerais, mais garde la bourée.

He was again imprisoned (1530), but obtained the favor of the king by a poem and was again released. Dreading further imprisonment, he sought refuge, in 1535, at the court of the queen of Navarre. In 1536 we find him at Ferrare, Italy, at the court of the duchesse Rénée, where he formed a friendship with Calvin. Pope Paul III. ordered the duchess not to harbor those pestilent men. They left together and went to Venice. But he was no suitable companion for Calvin; Marot was simply a free-thinker. Their bond of friendship was hatred of the corruptions of the church. Calvin was building a

faith hedged round about with the same dogmatism that he was combating. Marot would soon have lampooned that as caustically as he had the Roman church had Calvin not been a fellow-sufferer from persecution. Marot reappeared at court between 1538 and 1545, but was considered a dangerous heretic; yet he obtained employment in translating the Psalms of David from the Hebrew into French rhythm. The church condemned it, the king interdicted its publication; but it circulated nevertheless, and became one of the favorite studies of the Jansenists and Calvinists. The psalms were set to music by Goudimel, and sung in the meetings of the Protestants. Marot felt himself in danger in Paris, and joined Calvin in Geneva. But he found the austerities of the latter and his followers as repugnant to him as the weaknesses of the monks. Accused of playing backgammon and other frivolities, he found it more pleasant to leave the city than to reside in it, and sought refuge in Turin, where he died poor at the age of 50. La Harpe says of him: "The name of Marot marks the first epoch really notable in the history of our poetry." Another critic considers him remarkable chiefly as being the first to mold French to a really polished and melodious verse. His works form a singular variety of tracts, songs, ballads, letters, cock-and-bull stories, madrigals, epigrams, epitaphs. He was the Tom Moore of his day—precise in the expression of his thought, and at once witty and graceful. The *Roman de la Rose*, *Frère Lubin*, *Frère Thibeaud*, *A Madame d'Alençon*, and the translations of the Psalms, are a few of his numerous works. His letters, *Épitres*, are considered his finest work.

MAROZIA, a Roman lady of noble birth, but of infamous reputation in the scandalous chronicles of her age, daughter of the equally notorious Theodora, was b. in the close of the 9th century. On the dissolution of all the moral ties of public and private life which the war of factions occasioned in Rome in the 10th c., Marozia, by her beauty and her intrigues, contrived to exercise great influence. She was married three times, and, if we may credit the narrative of Luitprand, had skill and address enough to procure the deposition and death of the pope, John X., and the elevation of her son—the fruit, it is alleged, of adulterous intercourse—to the pontificate, under the name of John XI. This, however, rests on the testimony of Luitprand, who wrote some time after the period, and whose authority is considered more than doubtful not merely by Muratori, but even by so critical and unbiased a writer as Dr. Pertz. Marozia's latter years brought on her the punishment of her crimes. She died in prison at Rome in 938.

MARQUE, Letters of. See Letters of Marque.

MARQUESAS ISLES are, properly speaking, the southern group of the Mendaña archipelago, in Polynesia, the northern group bearing the name of the Washington islands; but the name is also applied to the whole archipelago. The Marquesas isles, in lat. 7° 30′ to 10 °30′ s., long. 138° to 140° 20′ w., were discovered by Mendaña de Neyra, a Spanish navigator, in 1596; the Washington isles were discovered in 1791, by Ingraham, an American. Area of the group as under the French protectorate, 500 English sq.m.; pop. 10,000. The Marquesas isles were named after the viceroy of Peru, Marquesas de Mendoza. In 1842 the Marquesas isles submitted to the French, and they are now governed by independent chiefs, under the protectorate of France.

MARQUETRY (Fr. *marqueterie*), the art of inlaying wood with wood of other colors, or with various other materials, as metal, ivory, shell, etc.

MARQUETRY (*ante*). See Buhl-work; Inlaying; Mosaic; *ante*.

MARQUETTE, a co. in n. Michigan, intersected in the e. and n.e. by the Marquette, Houghton and Ontonagon railroad, and the Chicago and Northwestern railway; about 3,425 sq.m.; pop. '80, 25,393—11,868 of American birth, 154 colored. In the n.e. it forms part of the shore of lake Superior, and it is drained by numerous rivers and creeks, the Escanaba and Michigamme being the most important, and has lake Michigamme in the north. Pine forests cover a large extent of the surface, which is generally level. Its agricultural products are potatoes, butter, maple-sugar, and oats. Live stock is raised to some extent. Its mineral products are granite, iron ore (red oxide), lead, and limestone. Iron is found in great abundance, especially in Iron mountain, a ridge rising in the n.e. section to the height of 900 ft. above the level of lake Superior. Under the most favorable circumstances the yield is about 200,000 tons from this mine annually. Mining is the chief industry. Its manufactories consist of furnaces for the manufacture of pig-iron, mining powder, charcoal, and nitro-glycerine. There are lumber and lath works and machine shops. Seat of justice, Marquette.

MARQUETTE, a co. of s. central Wisconsin; 490 sq.m.; pop. '80, 8,907. Surface level and traversed by Fox river; soil fertile; corn, wheat, and wool are the staple products. Capital, Montello.

MARQUETTE, a city in Michigan, a shipping point for the coal-mines of Marquette co. and depot of supplies, by the s. shore of lake Superior; on a bluff 25 ft. in height; pop. '70, 5,242. It has an excellent harbor with convenient piers reaching far into the lake. It is 500 m. from Detroit by water, and 430 m. by rail from Chicago. It is 95 m. s.e. of Houghton, and is the e. terminus of the Marquette, Houghton and Ontonagon railroad, besides having communication with the large cities by steamer. It is lighted with gas, has several machine-shops, foundries, rolling-mills, and blast furnaces. It has a fine opera-house; 3 banks, with an aggregate capital of $700,000, 2 of them national;

6 churches, 3 public halls, a park of forest trees, good schools with expensive edifices, a newspaper, a well-organized fire department, and a public library. Its water supply is brought from the lake by the Holly system. Roofing-slate and brown stone are quarried.

MARQUETTE, JACQUES, 1637–75, b. France; came to Canada as a Jesuit missionary in 1666, and after spending a year and a half in the valley of the Three Rivers learning the Indian languages of several of the Algonquin tribes, was assigned to the Mohawk mission; but before going his direction was changed, and he was sent to lake Superior, where he founded the mission of the *Sault Sainte Marie* in 1668. In 1669 he was sent to La Pointe, among the Ottawas and Hurons. The Sioux broke up the mission and dispersed the Hurons, whom he followed to Mackinaw and the mission St. Ignatius, on the north shore, where he built a chapel in 1671. The following year, writing with great show of piety and holy zeal to father Dablon, the head of the order in Montreal, he congratulated himself with what he had accomplished, and expressed himself "ready to seek new nations toward the South sea who are still unknown to us, and to teach them of our great God," etc. He had heard in many ways from the Indians of the existence of a great river to the westward, whose course was south, and which they called by its present name, Mississippi. It was imagined by the missionaries to empty into the South sea or Pacific. Marquette was something of a surveyor and ambitious of explorations. As early as 1669, while at La Pointe, he had this voyage of discovery in his mind. The sagacious governor Frontenac was made familiar with the rumors of the great river, and while the unfortunate La Salle had been turned from his projected expedition in the same direction, Louis Joliet was commissioned by the governor to undertake the tour of discovery, and Jacques Marquette was instructed by the Jesuits to accompany him. The shores of lakes Huron, Superior, and Michigan had already been explored and rudely mapped. May 17, 1673, they started from Mackinaw in two canoes, with five French *voyageurs*, and proceeded to Green bay of lake Michigan, where the mission of St. François Xavier had been established in 1669. They reached the mouth of Fox river, ascended it to the rapids, which they passed by portage, and then to its source, where they found a village of Miami Indians. There procuring two fresh Indian guides, they carried their canoes over to the waters of the *Mescousin* or Wisconsin river. Down this they floated by day, till on June 17 they entered the Mississippi. They descended it for 300 m. without seeing a human being, when they perceived a trail on the e. side of the river, and discovered a village of Illinois Indians, by whom they were well treated. When they reached the junction of the Missouri, Marquette described it as a river whose rapids were violent, and in whose muddy stream the floating timber trunks and branches of trees swept by with a force that inspired fear. He proceeded down to the mouth of the Ohio. Still further down they discovered iron on the river bank, and were now greatly tormented by mosquitoes. They met Indians on this part of the river who had guns, hatchets, knives, hoes, and glass bottles for their gunpowder; and were informed that they were within ten days' journey of the sea; that they purchased goods that came from people of the east; and that those people dressed like themselves, and had images and beads. They found numerous and more civilized Indians as they proceeded, and when arrived at the mouth of the Arkansas, were received with much comfort and state in the Indian villages. Having arrived at lat. 34°, they feared to go further lest they should fall into the hands of the Spaniards, and on July 17 started to ascend the river. On reaching the Illinois they ascended it, instead of going farther up to the mouth of the Wisconsin. From the head of this stream they are supposed to have made the portage to lake Michigan at or near Chicago; and were greatly impressed with the beauty and fertility of the country. After an absence of 4 months, and a voyage in canoes of 2,550 m., they were back at Green bay the latter part of September, where Marquette remained, and Joliet proceeded to report to the governor at Montreal. On Oct. 25, 1674, Marquette with a party, in ten canoes, set out to form a mission settlement in Illinois. From the head of Green bay, at Sturgeon cove, they carried their canoes through the forest to the shore of lake Michigan, thence skirted the western shore of the lake to the Chicago river, where, enfeebled by sickness, he stopped, built a log hut, and spent the winter. On Mar. 30, 1675, their hut was inundated by a freshet in the river, and they gathered their necessaries to pursue the journey to the Illinois, which they made by the portage to the Des Plaines river, and finally arrived at the Indian town of Kaskaskia, where he says "he was received like an angel from heaven." After Easter he returned to lake Michigan, on which he embarked with two companions and explored in their canoe the eastern shore of lake Michigan. They had proceeded as far as a small stream, south of the one which now bears his name, when his strength failed, and he died peacefully, and was buried. The party continued their journey to Michilimackinac, or Mackinaw. In 1676 his bones were dug up by a party of Ottawas, who washed, dried, and boxed them carefully in birch bark, and forming a procession of 30 canoes, bore them with funereal chants to the mission of St. Ignace, north of Mackinaw, where the relics were received with solemn ceremonies, and buried beneath the floor of the chapel of the mission.

MARQUEZ, LEONARDO, b. Mexico, 1818; prominent during the war between Mexico and the United States, 1845–48, and in 1847 was active in the defense of the valley of

Mexico. In 1849 the successful revolutionary movement of Santa Anna was supported by Marquez, who headed a rising in Guanajuato. In reward for this service, Santa Anna, on receiving the presidency, promoted him to high command. Alvarez and Comonfort found a bitter and persistent antagonist in Marquez, who conducted against them a fierce guerilla warfare during 1856–57, and who, during the next three years, sustained Miramon and Zuloaga in their conflict with Juarez. This conflict he continued to wage independently after Miramon had retired from the field, and until the occurrence of the French intervention in 1861. He supported Maximilian in his progress through Mexico, and on the latter assuming the crown of the new empire, Marquez was appointed minister of the new government to Constantinople. From this mission he returned in 1866, and witnessed the downfall of the empire, partaking of the last struggles of Maximilian, and commanding the defense of the city of Mexico against the operations of Porfirio Diaz. On the surrender of the capital he fled to Havana, and has since made that city his residence. The career of Marquez, though brave and adventurous, was stained by unnecessary cruelty. In 1859 he gained the bloody victory of Tacubaya, and signalized his success by the execution, not only of prisoners of war, but of non-combatants, an act which gave him the significant name of "the tiger of Tacubaya." Other instances of a similar sanguinary temper occur in the execution, by his orders, of the prime minister Ocampo, and generals Valle and Degollado, who were his prisoners. In view of these facts, the established government of Mexico, after the downfall of Maximilian, set a price upon the head of Marquez; and on the occasion of the general amnesty granted in 1870, he was expressly excluded by name. It is due to him to state that he has made published statements denying the charges of cruelty which had been brought against him.

MAR'QUIS, or MARQUESS, the degree of nobility which in the peerage of England ranks next to duke. Marquises were originally commanders on the borders or frontiers of countries, or on the sea-coast, which they were bound to protect. In England the title of marquis was used in this sense as early as the reign of Henry III., when there were marquises or lords-marchers of the borders of Scotland and Wales; and the foreign equivalent of *markgraf* was common on the continent. The first English marquis in the modern sense was Robert de Vere, earl of Oxford, who was created marquis of Dublin by Richard II., to the no small offense of the earls who had to yield him precedence. The oldest existing marquisate is that of Winchester, created by Edward VI. in 1551. The title was first introduced into Scotland in 1599, when the marquises of Huntly and Hamilton were created.

The coronet of a marquis, as worn in the United Kingdom, is a circle of gold, with four strawberry leaves (or oak leaves), and as many pearls alternating with them, and placed on pyramidal points of the same height with the leaves. The mantle is scarlet, with three and a half doublings of ermine. A marquis is styled "the most honorable;" his wife is a marchioness; his eldest son takes by courtesy the next lower title in the peerage, except where that is identical with the title of the marquisate, in which case he must take the next lower still, as in the case of the marquis and earl of Salisbury, whose eldest son bears the courtesy-title of viscount Cranborne. The younger sons of a marquis are styled "lord," and daughters "lady," with the addition of Christian name and surname.

MARRIAGE, the union of a man and woman in the legal relation of husband and wife. This in one form or another is the oldest institution of society and the source of its most ancient laws. Society, indeed, could not long exist without some rules being imposed by necessity for the appropriation of men and women to one another, securing them in the enjoyment of one another's society, and defining their obligations to their children. According to the law or practice of the greater part of the civilized world, one man marries one woman at a time. The Mormon heresy on this subject is now being suppressed by force. But this familiar system of monogamy is a comparatively recent development of marriage. A great diversity of opinion exists as to the particular form of primitive marriage. It is conceivable that there may have been many forms. Polygynia and polyandria—one man with many wives, one wife with many husbands; these have certainly existed. By the most recent writer on the subject (Morgan, *Systems of Consanguinity and Affinity*, 1871; and *Ancient Society*, 1877) it is asserted that intercourse was originally promiscuous. This negation of marriage is vehemently disputed. Morgan also affirms a primitive custom of intermarriage between brothers and sisters; the consanguine family of the Malay civilization; and a custom of intermarriage of several sisters with each other's husbands, and of several brothers with each other's wives. This custom is said to result in the formation of a *gens*, governed in its marriage relations by the principle of exogamy—viz., selection of wives outside the *gens*. After this comes the marriage of single pairs with or without exclusive habitation. The patriarchal family was largely monogamous; and true monogamy does not appear before the rise of private property, lineal succession, and slavery. (See on this subject, McLennan, *Primitive Marriage*, 2d ed.; Tylor, *Early History of Mankind;* Lubbock's *Origin of Civilization;* Bachofen, *Das Mutterrecht.*) The primitive ceremonies of marriage are of immense number, and some of striking beauty. Those which have left the most distinct survivals in modern custom are sale and capture. As regards Christian Europe, in 1085 Hilde-

brand declared marriage to be a sacrament of the church; and at the reformation Calvin declared it to be an institution of God. The school of Grotius described it as a contract of partnership. Throughout Christendom marriage is generally accompanied by a religious ceremony. In the eye of the law, even where the intervention of a priest is on public grounds declared essential, marriage is a contract, but differs from other contracts because its incidents are fixed by public law, and because it affects the *status* of the contracting parties. The varieties of marriage as a modern legal institution are well summarized in Bergson's introduction to *Concordance entre les Codes Civils* (Paris, 1856). We can describe only the modes of constituting marriage in use in England, Scotland, and Ireland. For rights connected with the dissolution of marriage, see DIVORCE. For the effects of marriage on property, see HUSBAND AND WIFE.

England.—To insure deliberation and to preserve indisputable evidence of so important a fact, the English law makes certain forms essential to marriage. A breach of the contract to marry gives rise to an action of damages (though this remedy is being gradually condemned by public opinion); but marriage itself will not be set aside and treated as null merely because either party procured it by fraudulent representations. Marriage cannot be rescinded by either party or both at pleasure, though that effect is brought about in another way by certain kinds of misconduct, whether studied or not, of either party. See DIVORCE, JUDICIAL SEPARATION. Another circumstance in which marriage differs from other contracts is, that it cannot be entered into in a moment, but certain preliminary notices must be given, and forms gone through. From the year 1753 (the date of lord Hardwicke's act, 26 Geo. II. c. 33) to 1836 (the date of lord Russell's act, 6 and 7 Will. IV. c. 85, which first authorized marriages in registered buildings and before a registrar), the power of solemnizing lawful marriages, when the parties were neither Quakers nor Jews, was conferred by the legislature on the clergy of the established church only. Since the latter date persons have the option of two forms of contracting marriage: it may be with or without a religious ceremony; and if with a religious ceremony, it may be either in the established church or in a dissenting chapel. If the marriage is to take place in an established church, there must be publication of bans of marriage for three preceding successive Sundays, either after the second lesson or during the communion office; but a marriage license obtained from the ordinary of the district, or a special license from the archbishop, will dispense with bans; fifteen days' previous residence in the parish by one of the parties being necessary. A registrar's certificate, obtained on 7 days' residence and 21 days' notice, will also dispense with bans, but an established church clergyman is not bound to marry on this. The marriage must take place in the church, the marriage service of the church of England being read over, and this must be done in canonical hours—i.e., between 8 and 12 A.M., in presence of two witnesses. If the marriage is celebrated in a dissenting chapel (and for that purpose such chapel must be duly licensed and registered under lord Russell's act), a certificate or license must be got after notice from the registrar; and there must be present the registrar of the district as one of the witnesses, except in Quaker and Jewish marriages. If the marriage is not with any religious ceremony, it must take place in the office of the superintendent-registrar, and in presence of witnesses; both parties in the presence of witnesses there exchanging a declaration that they take each other for man and wife. The canonical hours must be attended to in all cases. The omission of any of these requisites with the knowledge of the parties, makes a marriage void. It is felony to celebrate a marriage in a private house, unless by special license from the archbishop. And in all cases the fact of the marriage must be entered in a church, and also in a civil, register; the latter being ultimately filed and kept in Somerset house, London, where a copy of the certificate of registration can be had for a small sum. The guilt of perjury is incurred by making or signing a false declaration on giving notice to the officer. When one of the parties to a marriage celebrated under the act 6 and 7 Will. IV. c. 85, resides in Scotland or Ireland, a certificate by the session-clerk in Scotland of due proclamation of bans there, or a certificate from an Irish registrar, is equivalent to a certificate by an English district registrar. In the case of the marriage of an infant—i.e., a person under 21 years of age—evidence of the consent of parents or guardians has to be produced to the registrar or other officer. If one of the parties applying for license or bans fraudulently represent that such consent has been obtained, he or she forfeits all benefit arising from the property of the infant; which will be ordered by the court of chancery to be settled on the innocent party, or, if both parties concurred in the fraud, on the children of the marriage. The absence of consent of parents or guardians, however, does not make a marriage null. It may sometimes happen that persons go through the form of marriage, and yet are not married; as where one of the parties is already married, the spouse being alive. In such case it is quite immaterial whether the party so remarrying is really ignorant that his or her spouse is alive, provided such is the fact; for though, after seven years, if nothing has been heard of one of two married parties, the other will escape the penalties of bigamy on marrying again, yet it depends entirely on whether the first spouse is really dead at the time, whether the second marriage is valid. Other instances where the marriage is void, though the ceremony is complete, are where the persons are related to each other within the forbidden degrees of consanguinity and affinity; where either of them is under age, or of unsound mind, or physically disqualified. In the last case the nullity must be declared in the divorce court. As regards

members of the royal family (except the issue of princesses married into foreign families), they must either get the sovereign's consent, or give 12 months' notice to the privy council, subject to objection from both houses of parliament, in terms of 12 Geo. III. c. 11. Marriage betwixt a divorced party and the adulterer is lawful in England. But no clergyman of the established church can be compelled to marry any person whose previous marriage has been dissolved on the ground of adultery.

The marriages of Quakers and Jews were excepted from the acts prior to 6 and 7 Will. IV. c. 85, and are now subject to a peculiar legislation. They need not be in a registered building, and the registering officer of the Quakers, or the secretary of the synagogue, is authorized to be present instead of the registrar. (For mixed Quaker marriages, see 23 and 24 Vict., 18 and 35 Vict. c. 10.)

The marriages of European British subjects in India are regulated by the imperial act 14 and 15 Vict. c. 40, and the Indian marriage act of 1865. As regards the colonies, the chief imperial statute is 28 and 29 Vict. c. 64, which, however, leaves the matter of registration to local acts. Generally, marriages celebrated in foreign countries according to the *lex loci* are recognized as valid if the parties are capable of marriage. Marriages abroad within the lines of the British army are sanctioned by 4 Geo. IV. c. 91; and marriages may take place before British consuls under 12 and 13 Vict. c. 68, and 31 and 32 Vict. c. 61.

Considerable changes have been made in the details of the marriage law of Ireland by the acts of 1870 and 1871, viz., 33 and 34 Vict. c. 110, and 34 and 35 Vict. c. 49. The first of these acts was required partly as a readjustment after the disestablishment of the Anglican church in Ireland; but it also provides a form of license to be issued by Episcopalian bishops or their nominees, and by the heads of the non-Episcopalian Protestant communions; and it contains important provisions relating to the legalization of marriages of different religious persuasions. Such marriages must be performed by a clergyman in a building set apart for the celebration of divine service, with open doors, between 8 A.M. and 2 P.M., and in the presence of two or more credible witnesses. A certificate from the local registrar is also required under pain of nullity. The act of 1871 gives the form of certificate required for a marriage by special license; it enables Roman Catholic bishops to issue licenses for mixed marriages, and it extends to such marriages the power of licensing previously given to other church officials.

Scotland.—In Scotland, the principle of the civil law, *consensus non concubitus facit matrimonium*, has been adopted; and this consent can be proved either by a regular ceremony *in facie ecclesiæ* publicly recorded, or in three other modes known to the law. The chief impediments to this consent are nonage, insanity, impotency, relationship within the prohibited degrees, subsisting marriage, adultery in the case of the adulterers, and, since lord Brougham's act (19 and 20 Vict. c. 96), non-residence in Scotland. There are many notorious cases of sham marriages, where a form has been gone through to prevent scandal or by way of joke, but no serious intention to marry was present. Also, if force has been used; or where an error as to the woman's chastity has been caused by her misrepresentation or concealment; or a mistake of personal identity occurs; or where a fraudulent conspiracy has been formed, the marriage is null. In Scotland, as elsewhere, down to the council of Trent, a sacerdotal benediction was essential to marriage; and the Scotch clandestine or inorderly marriage was one celebrated with an improper religious ceremony, and quite different from the irregular marriage (without religious ceremony) punishable under 19 and 20 Vict. c. 96. By 10 Anne. c. 7, Episcopalian ministers, and by 4 and 5 Will. IV. c. 28, all other priests or ministers not of the established church were permitted to celebrate marriage. This had previously been the privilege of the established church. Proclamation of bans takes place in the parish church, whether civil or *quoad sacra*, in which at least one of the parties has resided for six weeks. Irregular marriages are constituted by consent, and proved by a written or verbal declaration of interchange of consent *per verba de præsenti;* or by a promise to marry, on the faith of which intercourse has followed (these facts, according to one opinion, requiring to be proved by a decree of declarator); or by cohabitation and habit and repute. The consent which makes an irregular marriage may, of course, be given before the registrar, or may be proved by a conviction before the justices of the peace, under 17 and 18 Vict. c. 80, the registration act. An order appointing registration can be obtained on proof before the sheriff, under lord Brougham's act, 19 and 20 Vict. c. 96.

Much discontent was felt in Scotland with the corrupt practice in proclaiming bans. The proclamation was generally not made on three successive Sundays, as required by law, but thrice on one Sunday; and for this illegality the session-clerks were in the habit of charging higher fees than would otherwise have been exigible according to custom. Indeed, the fees charged varied largely over the country, and in some places were so exorbitant that, in the opinion of many authorities, they were a direct occasion to concubinage and irregular marriage. The dissenters too, rightly or wrongly, felt aggrieved by the necessity of having recourse to the parish church. To remedy this state of things, the marriage notice (Scotland) act, 1878, was passed, "to encourage the celebration of regular marriages." According to this act, where two persons residing in Scotland wish to marry regularly, but without bans, each of them gives notice, in a form provided by the act, to the registrar of the parish or district in which he or she has lived for fifteen days immediately before; and this notice is entered by the registrar in "the marriage

notice book," which anybody can inspect for one shilling; and for seven consecutive days after receiving the notice, the registrar is bound to keep posted up in a conspicuous and accessible place on the door or outer wall of his office, a public notice of the marriage, in another form provided by the act. Where both persons live in the same parish or district, one notice is enough. After the seven days, if no objection to the marriage appears on the face of the notice, and if no objection is stated by a third perty in a writing subscribed by him and supported by a declaration taken before the registrar, the latter must grant to the person giving notice a certificate of due publication; and this certificate is sufficient authority for a minister, clergyman, or priest to celebrate a regular marriage, just as if it were a certificate of proclamation of bans. The certificate must be used within three months of its date; and no minister of the church of Scotland is obliged to celebrate a marriage not preceded by proclamation of bans. One party to the marriage may produce a registrar's certificate, and the other a certificate of bans. The act imposes severe penalties on those who celebrate a marriage with a religious ceremony but without a certificate of the one kind or the other; on registrars granting certificates not authorized by the act; and on persons guilty of willful falsehood in a notice, a declaration, or an objection. The registrars keep a supply of forms for use under the act. As regards the treatment of objections made to the registrar; where these relate merely to some formality or statutory requirement, the registrar must make inquiry, and report to the sheriff, who may direct the notice to be either amended or canceled; but where the objection relates to a legal incapacity to marry or a legal impediment to marriage, the registrar is forbidden to issue a certificate until he sees the judgment of a court of law disposing of the objection.

Ireland.—As regards marriages celebrated in what was once the established church of Ireland, not much difference existed between England and Ireland, except that bans, being under the canons and rubrics of the church, were more easily proclaimed, and the use of licenses (which were much cheaper) was more common. Roman Catholic marriages were under the common law, and if celebrated by a priest were valid without bans, license, notice, residence, or consent. Mr. Monsell's act, 26 and 27 Vict. c. 90, directs them to be registered. Presbyterian marriages were regulated by the Irish marriage act, 7 and 8 Vict. c. 81, passed in consequence of the famous case of *Queen and Millis*, invalidating all celebration of mixed marriages by Protestant non-conformists. This act and the act of 26 and 27 Vict. c. 27, relating to the registration of places of public worship for the solemnization of marriage, are extended by the act 36 Vict. c. 16 to meet the case of communities "who are not Roman Catholic, and who do not describe themselves as Protestant." Other non-conformist marriages were by registrar's certificate or license. For a long time, mixed marriages by the Catholic clergy were forbidden by 19 Geo. II. c. 13.

MARRIAGE (*ante*). The common statement that marriage is a contract is open to many objections. It is argued that the stipulations are *in futuro*, and that there can be no conditions or limitations attached, and that, while the law of contract supposes all parties to stand on an equal footing, the law of marriage, like that of other *status*, presupposes that they are not equal, and has even been called the "law of unequals." Undoubtedly the best statement is that the term marriage is used in law, as, indeed, in common language, in two entirely distinct senses: first, to denote the contract itself; and, secondly, to designate the resulting condition or *status*. The relations of the parties to one another in this *status*, their mutual rights, duties, and restraints, and, more especially, the powers of the wife as to tenure and disposition of property, are treated under the heads of HUSBAND and WIFE; and DIVORCE, *ante*. The question now in hand is, What constitutes a legal marriage in the United States? In the first place, it may be stated, generally, that the law on this subject is, in this country, far more liberal in relation to ceremonies and formalities than in any other civilized land, with the single exception of Scotland. The statutes of the various states, it is true, differ greatly, and in some instances the discrepancies amount to positive contradiction; but the general tendency is in the direction indicated. In defense of this tendency it may be said that public policy favors marriage, that liberal construction often protects an innocent but ignorant party from the consequences of imposition, and that it tends to discourage vice. On the other hand, it might be urged that to accept very slight evidence as proof of a valid marriage is to encourage thoughtless and improvident union, to open a door for the legal sanction of vicious entanglements, and that the most sacred engagement of life cannot be surrounded by too many safeguards.

To constitute a valid marriage there must first be legal capacity; which, in most states, is held to exist in the case of males at the age of 14, and of females at 12. There must next be free consent and mutual agreement. But not even in Scotland does consent alone complete the contract. The wording of the law is: "*consensus et concubitus*," in other words, there must be cohabitation. Yet the *essence* of the contract is consent, and many rulings indicate that in the United States subsequent cohabitation is not a requisite. The consent must be *in verba præsenti*, in words of the present and not the future. Here arises a remarkable discrepancy in the method by which the courts in different states have arrived at the same result—the enforcement of loosely constructed marriages. Some few, following the law of Scotland, have declared that an agreement

in futuro followed by cohabitation was sufficient, while most maintain the opposite doctrine. Thus, in a case where the parties agreed to live as if man and wife, and to allow their fellow-boarders to suppose them so, and that after the occurrence of certain events they should in fact be married, it has been held in one state that this was a good contract, while in another state the opposite was held in a very similar state of facts. But besides consent, the statutes of all the states impose regulations as to license, religious ceremony, consent of parents if under a certain age, and others, many and various. Are these requirements of such a nature as to render a contract entered into without compliance with their provisions void or voidable? In the earlier cases great reluctance was shown to admit that such a contract could stand. In *Milford vs. Worcester*, 7 Metcalf, 48, it was held by the courts of Massachusetts that a marriage without statutory compliance was absolutely void. So Parsons, in his work on contracts, says that he knows of no case in which a mere agreement to marry, with no formality and no compliance with any law or usage regulating marriage, is actually permitted to give both parties and their children all the rights, and lay them under all the obligations and liabilities, civil and criminal, of a legal marriage. But he reluctantly admits that recent decisions tend very strongly that way. And in not very recent cases it has been held, both in Pennsylvania and in New Hampshire, that a marriage contract in words of the present is valid without forms or witnesses; while the Illinois supreme court has gone so far as to say that, where there has been cohabitation, the presumption of marriage exists until overthrown by direct evidence—a very doubtful doctrine. See also *Fenton vs. Reed*, 4 Johnson, 54. In New York the rulings have been very strong in support of recognizing such marriages, and it may be regarded as now well-established law that the non-compliance with statutory provisions does not render a *bona-fide* contract void, and can be dealt with only by inflicting the prescribed penalties of fine or imprisonment on the negligent parties; though in certain cases it may render the marriage *voidable*. It is not necessary that both parties should know that the agreement to be legal man and wife is good in law. The actual agreement—which of course must be to assume the legal relations of man and wife, not simply to live together—is enough; and if, while one of the parties is acting in good faith, the other believes that he can legally renounce the contract, he is not to benefit by his treacherous conduct. As to whether such a contract as has been described has actually been completed, the question is purely one of evidence; and it is admitted on all sides in this country that circumstantial evidence, such as cohabitation, general repute, reception as man and wife by the family and by neighbors and friends, may be admitted, and their weight passed upon by the jury.

It is in general true that the *lex loci* applies to marriage contracts; that is, if a marriage is good where it is contracted, it is good anywhere; and it has even been held that where, in Massachusetts, a white man and negro woman went to Rhode Island for the ceremony, in order to avoid a prohibitory statute of the first state, their marriage could not be treated as void in Massachusetts. But suppose the laws of Utah allow polygamy, is it to be recognized as valid elsewhere? or, if the people of one state regard as incestuous what is allowed in another, are the people of the first to have no protection from the presence of what they consider a disgraceful example? Probably the courts in such cases would hold that *lex loci* may be overruled by public policy, but the decisions on the point are not yet clear. A peculiar class of cases of recent date, in this country, arises from the laws of Southern states in regard to the condition and marriage of colored persons, and especially their intermarriage with whites. It is held in *Frusher vs. The State*, 3 Texas Court of Appeals, 263, that such intermarriage is illegal; in North Carolina a marriage of the kind made in another state, but without intent to avoid the law, was ruled good; and by similar reasoning it has been decided that, in a case where the intent to avoid the law was obvious, the contract was void. But the main point of interest as to these cases is whether such laws are constitutional, or whether they conflict with the 15th amendment. On this point, we believe, there is as yet no decision by the supreme court.

Here, as in England, the common-law principles as to contracts in restraint of marriage and marriage-brokerage contracts are in full force. Thus, a bond by a widow not to marry again is absolutely void; and, in general, the law regards with extreme disfavor any undertakings or contracts as regards marriage which might have been the result of coercion or fraud.

MARRIED WOMAN. See HUSBAND AND WIFE.

MARROW is a substance of low specific gravity, filling the cells and cavities of the bones of mammals. There are two varieties, which are known as *watery marrow* and *oily marrow*. In some of the short bones, as the bodies of the vertebræ and the sternum, the marrow has a reddish color, and is found on analysis to contain 75 per cent of water, the remainder consisting of albuminous and fibrinous matter with salts and a trace of oil. In the long bones of a healthy adult mammal, the marrow occurs as a yellow, oily fluid, contained in vescicles like those of common fat, which are imbedded in the interspaces of the medullary membrane, which is a highly vascular membrane lining the interior of the bones. This marrow consists of 96 per cent of oil, and 4 of water, connective tissue, and vessels.

The oily matter of the marrow is composed of the same materials as common fat, with the oleine (or fluid portion) in greater abundance. Being of low specific gravity, it

is well suited to fill the cavities of the bones, and forms an advantageous substitute for the bony matter which preceded it in the young animal. Its special uses are not very clearly known, but the fact that it loses much of its oil, when the general nutritive powers fail, or when certain forms of disease attack the bone, shows that it plays some definite part in the economy.

MARROW CONTROVERSY, one of the most strenuous and memorable struggles in the religious history of Scotland, took its name from a book entitled the *Marrow of Modern Divinity*, written by a Puritan soldier in the time of the commonwealth. The highly "evangelical" character of this work, and especially its doctrine of the free grace of God in the redemption of sinners, had made it a great favorite with the few zealous and pious ministers then to be found in the church of Scotland, and in 1718 an edition was published by the rev. James Hog of Carnock, followed, in 1719, by an explanatory pamphlet. The general assembly of the same year appointed a commission to look after books and pamphlets promoting such opinions as are contained in the *Marrow*, and to summon before them the authors and recommenders of such publications. The committee, after an examination, drew up a report, which was presented to the next assembly, that of 1720, and the result was the formal condemnation of the doctrines of the *Marrow*, a prohibition to teach or preach them for the future, and an exhortation (strong, but vain) to the people of Scotland not to read them. This act of the assembly was immediately brought by the celebrated Thomas Boston (q.v.) before the presbytery of Selkirk, who laid it before the synod of Merse and Teviotdale. The "evangelical" ministers in the church, few in number, but supported by a very considerable amount of popular sympathy (for the *Marrow* by this time ranked next to the Bible in the regards of the religious portion of the Scottish peasantry), resolved to present a representation to the next general assembly (1721), complaining of the late act, and vindicating the "truths" which it condemned. Twelve ministers signed the representation—James Hog, Thomas Boston, John Bonnar, James Kid, Gabriel Wilson, Ebenezer Erskine, Ralph Erskine, James Wardlaw, James Bathgate, Henry Davidson, William Hunter, and John Williamson. These are the famous "Marrow-men"—also known as the "twelve brethren" and the "representers"—whose names were long held in great veneration by the lovers of "evangelical" religion. A commission of the assembly of 1721 was appointed to deal with the twelve, and a series of questions was put to them, to which answers were drawn up by Ebenezer Erskine and Gabriel Wilson. These replies did not prove quite satisfactory, and the "Marrow-men" were called before the bar of the assembly (1722), and solemnly rebuked. Nevertheless, as the assembly was not supported in the position it had assumed by the religious sentiment of the nation, no further steps were taken in the matter, and thus the victory virtually lay with the evangelical recusants. It was, however, substantially the same controversy—though it did not go by the name—which, 11 years later, resulted in the deposition of Ebenezer Erskine, and the origination of the "secession" body. See BOSTON, THOMAS, and ERSKINE, EBENEZER.

MARRUCINI, an ancient people in central Italy, on a narrow tract of land along the right bank of the river Aternus. Their territory extended from the Apennines to the Adriatic; between the Vestini on the n. and the Frentani on the s.; and between the Peligni and the Adriatic on the e. and west. They were an independent nation, said to be descended from the Sabines, and generally were in alliance with their neighbors, the Marsi and Peligni. They entered into alliance with the Romans in 304 B.C., but rebelled at the beginning of the social war. Their only place of importance was Teste, now Chieti, on the right bank of the Aternus, now the Pescara.

MARRUM. See AMMOPHILA.

MARRYAT, FREDERICK, an English sailor and novelist, was the son of a West India merchant, and was b. in London, July 10, 1792. On leaving school he entered the navy as a midshipman under lord Cochrane. In 1812 he attained his lieutenancy, and was made commander in 1815. While afloat he saw much active service, established a high character for bravery, and was made a C.B. in June, 1825. About 1830 he wrote his first novel, entitled *Frank Mildmay*, and this was followed in rapid succession by those graphic and humorous pictures of sea-life which have taken a permanent place in every English circulating library. He died at Langham, in Norfolk, Aug. 2, 1848. He was married, and left six children. Marryat's works are too numerous to be enumerated here; the most popular are perhaps *Midshipman Easy; Peter Simple; Jacob Faithful;* and *Japhet in Search of a Father.* His fictions are full of adventure, and are characterized by a certain rude breadth of humor. Since Smollett's time, no novels have provoked so much laughter as his.

MARS, a contraction of MAVERS or MAVORS; in the Oscan or Sabine language, MAMERS, the name of an ancient Italian divinity, identified by the Græcizing Romans with the Thracian-Hellenic *Ares.* It will, however, be better to treat the two conceptions separately.

The Roman Mars, who as a war-god is surnamed *Gradivus* (= *grandis divus*, the great god), also bore the surname of *Silvanus*, and appears to have been originally an agricultural deity; and propitiatory offerings were presented to him as the guardian of fields and flocks; but as the fierce shepherds who founded the city of Rome were even more

addicted to martial than to pastoral pursuits, one can easily understand how *Mars Silvanus* should have, in the course of time, become the "god of war." Mars, who was a perfect personification of the stern, relentless, and even cruel valor of the old Romans, was held in the highest honor. He ranked next to Jupiter; like him he bore the venerable epithet of *Father* (Mars-*piter*); he was one of the three tutelary divinities of the city, to each of whom Numa appointed a flamen; nay, he was said to be the father of Romulus himself (by Rhea Silvia, the priestess of Vesta), and was thus believed to be the real progenitor of the Roman people. He had a sanctuary on the Quirinal; and the hill received its name from his surname, *Quirinus*, the most probable meaning of which is *the spear-armed*. It was under this designation that he was invoked as the protector of the *Quirites* (citizens)—in other words, of the state. The principal animals sacred to him were the wolf and the horse. He had many temples at Rome, the most celebrated of which was that outside the *Porta Capena*, on the Appian road. The *Campus Martius*, where the Romans practiced athletic and military exercises, was named after him; so was the month of March (*Martius*), the first month of the Roman year. The *Ludi Martiales* (games held in his honor) were celebrated every year in the circus Aug. 1.

ARES, the Greek god of war, was the son of Zeus and Hera, and the favorite of Aphrodite, who bore him several children. He is represented in Greek poetry as a most sanguinary divinity, delighting in war for its own sake, and in the destruction of men. Before him into battle goes his sister *Eris* (Strife); along with him are his sons and companions, *Deimos* (Horror) and *Phobos* (Fear). He does not always adhere to the same side, like the great *Athena*, but inspires now the one, now the other. He is not always victorious. Diomede wounded him, and in his fall, says Homer, "he roared like nine or ten thousand warriors together." Such a representation would have been deemed blasphemous by the ancient Roman mind, imbued as it was with a solemn Hebrew-like reverence for its gods. The worship of Ares was never very prevalent in Greece; it is believed to have been imported from Thrace. There, and in Scythia, were its great seats, and there Ares was believed to have his chief home. He had, however, temples or shrines at Athens, Sparta, Olympia, and other places. On statues and reliefs, he is represented as a person of great muscular power, and either naked or clothed with the chlamys.

MARS, one of the planets. See SOLAR SYSTEM.

MARS, ANNE FRANÇOISE HYPPOLYTE BOUTET, 1779–1847; b. France; called Mademoiselle; one of the most illustrious French actresses, daughter of an excellent actor named Monvel and an actress *Mlle.* Mars-Boutet, both of Paris. At the age of 14 she appeared at the comédie Française in personations of ingenuous childhood, under the care of Mlle. Contat, the prima donna of the theater. These simple parts continued for many years to be her rôle, and it was not till she had reached her 24th year that her first grand success was obtained in *L'Abbé de l'Epée* in the part of the deaf and dumb girl. From that time forward, through a period of nearly 40 years, she acted through the whole range of dramatic art with a fullness of talent that never failed to present with delicacy, power, and good taste each new character in which she appeared. Beginning her career as a child in the stormy days of the revolution, a mother at 16 achieving her first great triumphs in the early days of the first empire, rendering more admirably than her predecessors the heroines of the classic drama of the great poets of France before the revolution, and finally taking up one after another the works of succeeding generations of dramatists and poets, Victor Hugo, Alfred de Vigny, Scribe, Dumas, and breathing into their heroines the glow of her own talents. She prolonged her apparent youth, beauty, and power almost to her dying day. The habit of playing ingenuous characters in her youth, and many years of practice in simple rôles before assuming leading parts, seem to have ripened those delicate and superb coquetries which beauty and genius combined find latitude to exhibit on the stage. Beautiful in face, imposing in form, suave in manner, tasteful in dress, with a voice melodiously modulated at will to suit every emotion, she was in appearance the ideal actress. Her *liaison* with the emperor Napoleon seems to have made a real impression on her heart, for on the accession of Louis XVIII. she refused to use the customary ejaculation of *vive le roi*, and had some trouble with the theatrical manager about it; but the king covered the misunderstanding by settling upon her 30,000 livres. She was not married, and her private life was that of the corrupt society of her time. Although a generous giver, she left at her death an estate of 800,000 francs.

MARSA'LA, a large fortified seaport on the w. coast of Sicily, 16 m. s.s.w. of Trapani. Pop. of commune '72, 24,202. It stands in a fruitful and well-cultivated district, and is a regularly built and pleasant town, with a college, a cathedral, a gymnasium, and several conventual establishments. It occupies the site of Lilybæum, the ancient capital of the Carthaginian settlements in Sicily, and was selected by Garibaldi as the landing-point of his volunteers in his famous Sicilian campaign, 1860. It obtained its present name from the Arabs, who, when they held Sicily, esteemed this part so highly that they called it *Marsa Alla*, "Port of God." Its harbor is encumbered with sand, but its celebrated wines form an export trade of great importance, chiefly since 1802, when they were adopted by lord Nelson for the use of the British fleet. Thirty thousand pipes of Marsala wine, which resembles sherry, are annually manufactured, two-thirds being exported. Marsala has also a large export trade in grain, oil, salt, and soda.

MARSCH'NER, HEINRICH, 1795–1861; b. Germany; a self-educated composer. His opera, *Der Kyffhäuserberg*, appeared in 1816; *Heinrich IV. und Aubigné*, in 1819; *Der Vampyr*, his best work, in 1828. In the meantime he had become director of the opera at Dresden, a post which he gave up in 1830, when he was appointed chapel-master to the king of Hanover. There he composed *Das Schloss am Aetna* and *Hans Heiling*, and set to music Mosenthal's *Goldsmith of Ulm*.

MARSDEN, SAMUEL, 1764–1838; b. England; educated at the free grammar-school at Hull. He began life as a tradesman at Leeds. He joined the Methodists, and belonged to them for some time; but, desiring to obtain a collegiate education, he entered the English church; studied at St. Joseph's college, Cambridge; and before taking his degree was offered the chaplaincy to New South Wales. He was ordained in 1793, and in 1794 sailed as chaplain to the new penal colony at Paramatta, near Sydney, Australia. Seven years previously, the first convict ship had been sent out, yet up to this time religious instruction was unknown. For soldiers, settlers, convicts, and all, Marsden was the only Christian teacher. Receiving a grant of land and 13 convicts to till it as part payment for his services, he made it the model farm in New South Wales, and devoted the profits from it to the support of schools and missions. A mutinous spirit showing itself among the convicts, Marsden sailed for England, mainly for the purpose of obtaining permission for the friends of the convicts to accompany them to the penal colony. This was refused, but his proposal that the convicts should be taught trades was well received. Having had some intercourse with the Maoris of New Zealand, and found them to be superior to the Australian native, he endeavored, while in England, to obtain funds for the formation of a mission among them, and missionaries to accompany him. He endeavored to obtain help from the church missionary society. No clergyman could be found to undertake the mission, but two laymen, William Hall and John King, consented to go as pioneers, and accompanied Marsden to Australia, Aug., 1809. They were soon followed by Thomas Kendall. Marsden having vainly endeavored to get aid in fitting out a missionary ship to transfer these lay missionaries to their field of labor, purchased a small vessel at his own expense, which was named the *Active*. He sailed with them, and was kindly welcomed by the natives. He employed these teachers in laying the foundations of a Christian civilization. He frequently visited them, and in his fourth visit took with him the rev. Henry Williams, who afterwards became bishop of a Maori district. He procured reinforcements for the mission from the English and Wesleyan churches, induced the natives to adopt a fixed form of government, provided for the preparation of a grammar and dictionary of the Maori language, and lived to see the people Christianized. In his 72d year of age he made his seventh and last visit, and was greeted everywhere as the friend of the Maori. He found Sunday generally observed, polygamy and cannibalism fast diminishing, and the people in many respects greatly improved.

MARSDEN, WILLIAM, D.C.L., son of a merchant; 1754–1836; b. Dublin. In 1771 he was appointed to the civil service of the East India company at Bencoolen, Sumatra; became secretary to the government, and acquired a thorough knowledge of the Malay language; returned to England in 1779 with a pension, and devoted himself to literature, and published a *History of Sumatra*. In 1795 he was made second secretary, and afterwards first secretary, to the admiralty. In 1807 resigning, he retired to private life and study. In 1812 he published his *Grammar and Dictionary of the Malay Language*, and in 1817 a translation of *Marco Polo*. In 1831 he voluntarily resigned his pension. In 1834 he presented to the British museum his rich collection of oriental coins, and his library of books and oriental MSS. to King's college. He published also *Numismata Orientalia* (eastern coins); *Catalogue of Dictionaries, Vocabularies, Grammars, and Alphabets;* and some papers on the language, manners, and antiquities of the east in the *Philosophical Transactions* and the *Archæologia*.

MARSEILLAISE, the name by which the grand song of the first French revolution is known. The circumstances which led to its composition are as follows. In the beginning of 1792, when a column of volunteers was about to leave Strasbourg, the mayor of the city, who gave a banquet on the occasion, asked an officer of artillery named Rouget de Lisle, to compose a song in their honor. His request was complied with, and the result was the *Marsellaise*—both verse and music being the work of a single night! De Lisle entitled the piece *Chant de Guerre de l'Armée du Rhin*. Next day it was sung with that rapturous enthusiasm that only Frenchmen can exhibit, and instead of 600 volunteers, 1000 marched out of Strasbourg. Soon from the whole army of the north resounded the thrilling and fiery words *aux armes, aux armes;* nevertheless the song was still unknown at Paris, and was first introduced there by Barbaroux when he summoned the youth of Marseilles to the capital in July, 1792. It was received with transports by the Parisians, who—ignorant of its real authorship—named it *Hymne des Marseillais*, which name it has ever since borne.

MARSEILLES, the first seaport of France and of the Mediterranean, in the department of Bouches-du-Rhone, is situated on the gulf of Lyons, 410 m. in a direct line s.s.e. of Paris, and in lat. 43° 17′ n., long. 5° 22′ east. Marseilles is a military place of the fourth class, and is defended by a citadel and other works; the roads are protected by the fortified isles of If (crowned by a castle, once a state-prison), Pomegue, and Ratonneau

Its harbor is formed by an inlet of the sea running eastward into the heart of the city, and from its extent (nearly 70 acres), and its great natural and artificial advantages, it is capable of accommodating 1200 vessels. The new harbor consists of a series of docks or *bassins* (*de la Joliette, de l'Entrepôt, Napoléon, Impérial*), upwards of a mile long, with an area of about 100 acres. Alongside the bassins de l'Entrepôt and Napoléon are the bonded warehouses, erected at an outlay of a million sterling, and the finest of the kind in Europe. From the margin of the old harbor the ground rises on all sides, forming a kind of amphitheater; and beyond the city proper the encircling hills, covered with vineyards and olive-gardens, are dotted with white country-houses. Immediately north of the harbor is the old town, with its narrow streets lined with high closely piled houses; but through it a wide avenue, with branches, has recently been driven. South of the old harbor is the church of St. Victor, the most ancient of Marseilles; and farther to the south rises the rocky hill of *Notre Dame de la Garde*, with its church, held in the highest veneration by the sailors of the Mediterranean. At the foot of the hill is the wide promenade, Cours Bonaparte. Other fine promenades are Le Cours and Le Prado. The principal public buildings are the hôtel de ville, the museum, the public library with its 78,000 vols., and the exchange. The *cafés* and shops of Marseilles rival those of Paris in splendor. Marseilles is the first commercial emporium of France. It has many soap-works, iron manufactories, sugar refineries, etc. The large vessels and steamers annually entering its harbor number upwards of 8,600, and measure above 2,600,000 tons. Marseilles is directly connected by rail with Lyons, Toulouse, and Nice; and is the packet station for Italy and the east. It is in point of population the third town of France, having had, in 1876, 234,690 inhabitants. (Total pop. of commune, including military, 318,868.) The formerly barren country round Marseilles has been of late greatly fertilized by means of the canal which supplies Marseilles with water from the Durance. During a portion of the year the climate of Marseilles is delightful, but in summer and autumn the heat is often intense. Cold, dry, and cutting winds from the n.e. render the climate at times exceedingly trying. In the environs of the town are about 6,000 *bastides*, or country villas.

Marseilles was founded by a Greek colony from Phocæa, in Asia Minor, about 600 years B.C. Its ancient name was *Massalia*, written by the Romans *Massilia*. It was an important member of the ancient Greek community, planted numerous colonies along the north Mediterranean shores, and introduced the germs of Greek civilization into Gaul. The Massaliots were long in intimate alliance with the Romans; but the city was at last taken by Julius Cæsar. In the 8th c. it was destroyed by the Arabs, and the maritime republics of Italy inherited the commerce of the Mediterranean which formerly had been centered in Marseilles. It was united, with the whole of Provence, to France in the reign of Charles VIII. In 1720, when it had again risen to great importance, it was ravaged by a fearful epidemic, and 40,000 of its inhabitants swept away. Since 1830 the commerce and industry of the city have increased vastly. The conquest of Algeria has brought increasing prosperity to Marseilles, and its North African trade is now an important part of its commerce.

MARSH, ANNE CALDWELL, 1798–1874; b. at Lindley Wood, Staffordshire, England. She was the author of more than 20 novels and tales, of which *Emilia Wyndham*, *Mt. Sorel*, and *Mordaunt House* are usually thought the best. Most of her works were written anonymously, and it is not certain how many are rightly attributed to her. Her best work is free from sensationalism, and of delicate conception, but lacks power; several of the stories have been republished in this country. During the latter part of her life she assumed the name of Marsh-Caldwell, and succeeded to the estate of Lindley Wood.

MARSH, GEORGE PERKINS, LL.D., an American philologist, was born at Woodstock, Vt., Mar. 17, 1801; graduated at Dartmouth college, New Hampshire, 1820; studied law at Burlington, Vt.; was elected to the supreme executive council of the state in 1835, and to congress in 1842 and 1849. He was for several years afterwards United States minister resident at Constantinople, and in 1852 was charged with a special mission to Greece. He traveled in the north of Europe, and became an adept in the Scandinavian languages. Between 1857 and 1859 he served as railroad commissioner for Vermont. In 1861 he was appointed U. S. minister in Italy. His most important works are a *Grammar of the Icelandic Language; The Camel, his Organization and Uses; Lectures on the English Language; The Origin and History of the English Language; Man and Nature.*

MARSH, DEXTER, 1806–53; b. Mass.; although possessed of little education, and occupying the humble position of a day-laborer, was a keen observer, and interested in natural history. While engaged in his work he often came across many fossil footprints on the large stone slabs which he quarried for paving-stones. Of these he made an extensive collection from many parts of the Connecticut valley, New Hampshire, and New Jersey. Many of his specimens were sold during his life, and are now distributed among various colleges and museums; but among those retained by him, and sold for over $2,500 after his death, were more than 500 slabs covered with footprints and marks of rain, and about 200 fossil fishes.

MARSH, HERBERT, D.D., 1757–1839; b. London. Having received his education and a fellowship at St. John's college, Cambridge, graduating with great distinction, he

removed to Germany in 1783, and resided several years at Göttingen and Leipsic, where he published, in German, several articles in defense of the policy of England in the continental wars. For this service he was rewarded with a pension on the recommendation of Mr. Pitt. In 1806 he received the title of D.D. by royal mandate. On the French invasion of Germany he returned to England, and in 1807 was appointed lady Margaret's professor of divinity at Cambridge. He abandoned the custom of lecturing in Latin, and lectured only in English. In 1816 he was made bishop of Landaff, and in 1819 of Peterborough. Bishop Marsh was learned in theology, politics, Greek, Latin, German, and oriental literature. He was the first who brought into England the biblical criticism of Germany. His principal works are a translation into English of Michaelis's *Introduction to the New Testament; Authenticity of the Five Books of Moses considered; The National Religion the Foundation of National Education; Lectures on the Criticism and Interpretation of the Bible; Lectures on the Authenticity and Credibility of the New Testament and on the Authority of the Old Testament.* Bishop Marsh was a strong opponent of both Calvinists and Roman Catholics.

MARSH, JAMES, D.D., 1794–1844; b. Hartford, Vt.; graduated at Dartmouth in 1817, and entered the Andover theological seminary, but suspended his studies there after the first year to return to Dartmouth as tutor. Returning to the seminary in 1820, he graduated in 1822. His studies at Andover extended beyond the ordinary limits, and included not only the modern languages, but the then new field of German erudition, and the works of Plato. He was also an appreciative reader of Wordsworth and Coleridge, and an article contributed by him in his senior year to the *North American Review* on ancient and modern poetry attracted wide attention. He also began at the same time a translation from the German of Bellerman's work on the geography of the Scriptures. His intense application to study injured his health, on which account, before his graduation, he visited the southern states. Though strongly disinclined to become a preacher, he was ordained as a Congregational minister in 1824. From 1824 to 1826 he was professor of languages in Hampden Sidney college, Va., giving a portion of his time, however, to the adjacent theological school. Here he began his translation of Herder's *Spirit of Hebrew Poetry*, the first parts of which appeared in the *Christian Repository* at Princeton. In 1826 he was appointed president of the university of Vermont, and it was at his suggestion that some important changes were made in the courses of study in that institution. Finding the duties of president irksome, he resigned the post, and accepted instead the professorship of moral and intellectual philosophy, which he held to the close of his life. In 1829 he contributed to the *Christian Spectator* a review of Stuart's *Commentary on Hebrews*, which contained the germ of his most characteristic writings. At this period he became acquainted with the writings of Coleridge, in which he found much to confirm and strengthen his own convictions. His introduction to the first American edition of the *Aids to Reflection* won him a high reputation at home and abroad. It was reproduced in London, and in 1853 prefixed to a complete American edition of Coleridge's works. In 1830 he published a volume of selections from the old English divines, including Howe's *Blessedness of the Righteous*, and Bates's *Four Last Things*. In 1833 he completed his translation of Herder's *Spirit of Hebrew Poetry*. He contemplated several important works, including a system of logic and a treatise on psychology, which he did not live to complete. His *Remains*, with a *Memoir* by prof. Joseph Torrey, appeared in 1843. He died in Colchester, Vt.

MARSH, OTHNIEL CHARLES, b. Lockport, N. Y., 1831; educated at Phillips academy, Andover, Mass., and at Yale college, where he graduated in 1860; and then took a two years' course of study in the Sheffield scientific school. He was then engaged in the same line of study at the German universities of Heidelberg, Breslau, and Berlin. On his return to this country he was, in 1866, appointed professor of paleontology at Yale, and still holds this position as well as the curatorship of the geological and kindred scientific collections. He is also one of the trustees of the fund of $150,000 given by the late George Peabody to the college "to found and maintain a museum of natural history, and especially in the departments of zoology, geology, and mineralogy," and was most actively concerned in the planning and erection of the massive and fire-proof Peabody museum, which is to form but one wing of the completed building when the funds for building and maintenance have sufficiently accumulated. From 1868 to the present time he has been constantly engaged in the discovery and classification of fossils of extinct animals of the Rocky mountain region, leading many expeditions in person, and directing the operations of others. In these explorations his parties have penetrated into the wildest solitudes under considerable personal hardships and dangers, and have obtained extensive collections of immense scientific value, including fossil animals hitherto unknown, to the number of several hundred. Among the new orders discovered are the *dinocerata*, a six-horned animal of the eocene period; the *pterodactyls*, or flying lizards; the *ichlyornithes*, a cretaceous bird furnished with teeth; and a great variety of bats, monkeys, and marsupials. In many papers published at intervals up to the present time (1881) he has described these and many other species, and is constantly adding to the collection by discovery and purchase. Within a few years the description by prof. Marsh of certain fossil bones found by him and, though belonging to the equine race, differing from the modern horse in several particulars, and markedly in the construction of the foot and

number of toes, has added to the evidences of the doctrine of natural selection and of the evolution of species, exhibiting, as is claimed, the gradual divergence by a species from the primary form, and the result therefrom of what have hitherto been regarded as orders of entirely distinct creation. Prof. Huxley has repeatedly claimed that these discoveries of Marsh completely supply the proof alleged to be wanting by the opponents of the doctrine of the "survival of the fittest."

Prof. Marsh has written many articles on scientific subjects which have appeared in almost all the scientific journals. He is a fellow of the royal geographical society and a member of many other associations at home and abroad.

MARSHAL (Fr. *maréchal*, Teut. *mare*, horse, and *sceale* or *schalk*, servant), a term, in its origin, meaning a groom or manager of the horse, though eventually the king's marshal became one of the principal officers of state in England. The royal farrier rose in dignity with the increasing importance of the *chevalerie*, till he became, conjointly with the constable (q.v.), the judge in the *curiæ martiales*, or courts of chivalry. An earldom is attached to the dignity, and the office of earl-marshal is now hereditary in the family of the duke of Norfolk. When the king headed his army in feudal times, the assembled troops were inspected by the constable and marshal, who fixed the spot for the encampment of each noble, and examined the number, arms, and condition of his retainers. With these duties was naturally combined the regulation of all matters connected with armorial bearings, standards, and ensigns. The constable's functions were virtually abolished in the time of Henry VIII., and the marshal became thenceforth the sole judge in questions of honor and arms. The earl-marshal is president of the English college of arms, and appoints the kings-at-arms, heralds, and pursuivants. The marshal's functions were formerly exercised in time of peace in the *aula regis* or king's great court, and on the division of the *aula regis*, he appointed deputies in the new courts; hence arose the offices of marshal of the king's (queen's) bench and of exchequer, whose principal duty is to take charge of persons committed to their custody by the court. Besides the earl-marshal there is a knight-marshal, or marshal of the king's (queen's) household. The marshal of the king's bench held two different courts, which have been altogether discontinued since 1849. The marshal or provost-marshal of the admiralty is an officer whose duty it is to act ministerially under the orders of the court of admiralty in securing prizes, executing warrants, arresting criminals, and attending their execution.

The dignity of marshal existed formerly in Scotland, where a different orthography was adopted, and the office of marischal was hereditary in the family of Keith. Sir Robert Keith, the marischal, was one of the most distinguished warriors in the army of Robert the Bruce; and his descendant, the marischal, in 1456, had the dignity of earl conferred on him with no other title but that of earl-marischal. There is little doubt that the lyon king-at-arms was, like the English kings-at-arms, originally subject to the marischal, but his dependence ceased at a very early period, and the heraldic functions discharged by the earl-marshal in England devolved in Scotland on the lord lyon, who held office directly from the crown. Scotland had no knight-marischal till 1633, when Charles I., at his coronation, created the office. In 1716 George, tenth earl-marischal, was attainted in consequence of his share in the rebellion of the previous year, and the office has since been in abeyance. In France the highest military officer is called a marshal, a dignity which originated early in the 13th century. There was at first only one *maréchal de France*, and there were but two till the time of Francis I. Their number afterwards became unlimited. Originally the marshal was the esquire of the king, and commanded the vanguard in war; in later times the command became supreme, and the rank of the highest military importance. From the title of this class of general officers the Germans have borrowed their feld-marschall, and we our field-marshal, a dignity bestowed on commanders distinguished either by elevated rank or superior talents.

MARSHAL (*ante*), in the United States, is used in three significations: 1. To denote the ministerial officer of the United States courts, there being one appointed to each judicial district. The duties of this officer resemble those of a sheriff in the state courts; he opens and closes the sessions of the district and circuit courts, serves warrants, and with his deputies enforces the execution of the internal revenue and other U. S. statutes. 2. To denote a leader or director of ceremonies, festivities, or processions. 3. In many states of the south and west the marshal is the head of the municipal police force, and is to be distinguished from the officers of the county called sheriffs, and from the officers of the justice courts called constables. In a few northern cities, formerly, the name was applied with doubtful propriety to special police officers.

MARSHALING OF ARMS is the combining of different coats-of-arms in one escutcheon, for the purpose of indicating family alliance or office. In the earlier heraldry, it was not the practice to exhibit more than one coat in a shield, but the arms of husband and wife were sometimes placed *accollée*, or side by side, in separate escutcheons; or the principal shield was surrounded by smaller ones, containing the arms of maternal ancestors; and we not unfrequently find maternal descent or marriage indicated by the addition of some bearing from the wife's or mother's shield. Then followed *dimidiation*, where the shield was parted per pale, and the two coats placed side by side, half of each being shown. By the more modern custom of impaling, the whole of each coat is exhibited, a reminiscence of the older practice being retained in the omission of bordures,

orles, and tressures on the side bounded by the line of impalement. The most common case of impalement is where the coats of husband and wife are conjoined, the husband's arms occupying the dexter side of the shield, or place of honor, and the wife's, the sinister side. Bishops, deans, heads of colleges, and kings-of-arms, impale their arms of office with their family coat, giving the dexter side to the former.

A man who marries an heiress (in heraldic sense) is entitled to place her arms on a small shield called an *escutcheon of pretense*, in the center of his achievement, instead of impaling.

Quartering, or the exhibiting different *coats* on a shield divided at once perpendicularly and horizontally, is the most common mode of marshaling arms, a practice which, however, was unknown till the middle of the 14th century. The divisions of the shield are called quarters, and are numbered horizontally, beginning at the dexter chief. The most common object of quartering is to indicate descent. The coats quartered in an escutcheon must all have been brought in by successive heiresses, who have intermarried into the family. In the case of a single quartering, the paternal arms are placed in the first and fourth quarters, and the maternal in the second and third. The third and fourth quarters may, in after-generations, be occupied by the arms of a second and third heiress. Sometimes an already quartered coat is placed in one of the four quarters of the escutcheon, then termed a grand quarter. We occasionally find a shield divided by perpendicular and horizontal lines into six, nine, or even more parts, each occupied by a coat brought in by an heiress; and in case of an odd number of coats, the last division is filled by a repetition of the first. In the course of generations, a shield may thus be inconveniently crowded by the accumulation of coats, including the several coats to which each heiress may, in a similar way, have become entitled, and in Germany, sometimes twenty or thirty coats are found marshaled in one escutcheon; but in British heraldry, families entitled to a number of quarterings, generally select some of the most important. Quarterings, at least in Scotland, are not allowed to be added to the paternal coat without the sanction of the heraldic authorities.

Sovereigns quarter the ensigns of their several states, giving precedence to the most ancient, unless it be inferior to the others in importance. In the royal escutcheon of the United Kingdom, England is placed in the first and fourth quarters, Scotland in the second, and Ireland in the third; the relative positions of Scotland and England, being, however, reversed on the official seals of Scotland. Spain bears the arms of Leon in the first and fourth quarters, and Castile in the second and third. An elected king generally places his arms surtout on an escutcheon of pretense.

MARSHALL, a co. in n.e. Alabama, watered by branches of the Tennessee river and by the Black Warrior; 450 sq.m.; pop. '80, 14,585. It has a rugged surface, broken by mountain ridges, a part of the Appalachian chain. The soil is generally fertile, productions being wheat, Indian corn, sweet potatoes, tobacco, butter, and cotton. Co. seat, Warrenton.

MARSHALL, a co. in n. Illinois, intersected centrally by the Illinois river, navigable to Lacon, and entering lake Peoria in the extreme s.w.; also, by the Peoria and Bureau Valley division of the Chicago, Rock Island and Pacific railroad; the Chicago to Illinois river branch of the Chicago and Alton, forming a junction with the Dwight to Washington and Lacon branch. The Illinois Central forms its e. border, with a junction at Wenona; 360 sq.m.; pop. '80, 15,036—12,610 of American birth, 37 colored. It is drained by Sandy creek, along whose banks and those of the Illinois river the soil is very fertile, and the surface is for the most part level prairie. Its products are: grain, tobacco, wool, sweet potatoes, wine, dairy products, sorghum, honey, and corn. At Henry, in the n. section, is a combination bridge, lock, and dam of the Illinois Improvement. It has manufactures of carriages, woolen goods, pumps, agricultural implements, cooperage, tin, copper, and sheet-iron ware; among its manufactories are foundries, machine shops, and distilleries. Bituminous coal is found and easily mined. Seat of justice, Lacon.

MARSHALL, a co. in n. Indiana, intersected by the Pittsburg, Fort Wayne and Chicago, and the Indianapolis, Peru and Chicago railroads, forming a junction at Plymouth; also by the Baltimore and Ohio railroad; 450 sq.m.; pop. '80, 23,416—22,111 of American birth, 9 colored. It is drained in the s.e. by the head waters of the Tippecanoe river, the Yellow river, and other branches of the Kankakee. Its surface is generally level, and diversified by groves of sugar maple and openings of hard-wood trees. Its soil is fertile and adapted to the raising of live stock, and the cultivation of fruit and vegetables, every kind of grain, wool, dairy products, honey, maple sugar, sorghum, and hops. It has manufactories of furniture, flour, lumber, hubs, wagons, carriages, and wooden goods; also breweries. Iron ore is found. Seat of justice, Plymouth.

MARSHALL, a co. in n. Iowa, intersected by the Central railway of Iowa, and the Cedar Rapids and Missouri river division of the Chicago and Northwestern railway, forming a junction at Marshalltown; 576 sq.m.; pop. '80, 23,752—20,680 of American birth, 123 colored. It is drained by the head waters of the Iowa river and other small streams. Its surface is mostly undulating prairie, with a moderate growth of timber, in which oak and ash predominate. It has a fertile soil, particularly in the valley of the Iowa, producing immense quantities of wheat, every variety of grain, fruit, live stock in great numbers,

wine, tobacco, hops, wool, sweet potatoes, dairy products, honey in large quantities, and sorghum. Its mineral deposits are coal, limestone, and marble. Its leading industries are the quarrying of marble, and the manufacture of soap, wagons, flour, oil, saddlery, and harness. It has machine shops, steam saw-mills for sawing stone, iron foundries, and breweries. Seat of justice, Marshalltown.

MARSHALL, a co. in n. Kansas; 900 sq.m.; pop. '80, 16,135—13,000 of American birth. It borders on Nebraska, and is traversed by the Big Blue and Little Blue rivers, and by the St. Joseph and Denver City and the Central Branch Union Pacific railroads. The surface is in great part a very fertile prairie, on which all the cereals are raised in large quantities. Chief city, Marysville.

MARSHALL, a co. in w. Kentucky, having the Tennessee river for its e. and n. boundary near its confluence with the Ohio, and drained by Clark's river and other tributaries; 400 sq.m.; pop. '80, 9,647—9,619 of American birth, 440 colored. It is intersected in the extreme n. by the Paducah and Elizabethtown railroad. Its surface is uneven and two-thirds covered with timber. Its soil is adapted to the raising of live stock, fruit, every variety of grain, wool, sweet potatoes, wine, sorghum, maple sugar, and hops. Among its manufactures are wagons, tobacco, and flour. Seat of justice, Benton.

MARSHALL, a co. in n. Mississippi, on the border of Tennessee, watered by the Coldwater, Tippah, and Tallahatchie rivers; 750 sq.m.; pop. '80, 29,333. It is intersected by the Mississippi Central railroad. The surface is varied, generally undulating, and the soil fertile. Productions are Indian corn, sweet potatoes, wheat, butter, and cotton. Co. seat, Holly Springs.

MARSHALL, a co. in central Tennessee, watered by the Duck river; 350 sq.m.; pop. '80, 19,260; the surface is generally level and the soil fertile. Productions are lumber, wool, grain, cattle, and live stock. Co. seat, Lewisburg.

MARSHALL, a co. in the s. part of that portion of West Virginia known as the "Panhandle," having the Ohio river on the w. and Pennsylvania on the e.; intersected by the Baltimore and Ohio railroad; 280 sq.m.; pop. '80, 18,840. A level country along the shore of the river, farther back it is undulating, the soil in all instances being fertile and under generally high cultivation. The productions are live stock, grain, and wool; and this county is rich in coal measures, not as yet extensively worked. Co. seat, Moundsville.

MARSHALL, the chief city of Calhoun co., Mich., and part of the township of the same name; pop. '70, 4,623. It is on the Kalamazoo river, and reached by the Michigan Central railroad; 108 m. w. of Detroit and 36 e. of Kalamazoo. The city was incorporated in 1859. Among the public buildings are a court-house, high school, and very fine union school, three banks, many churches, a paper mill, etc. The place is largely engaged in manufacturing flour, for which there are several great mills.

MARSHALL, Humphrey, 1812–72; b. Ky.; graduated at West Point in 1832, and resigned from the army the following year. He studied law and practiced in Louisville. On the outbreak of the Mexican war he joined the command of gen. Taylor, and at the battle of Buena Vista he behaved with great gallantry, leading a memorable charge of the Kentucky volunteer cavalry. At the close of the war he retired to a farm in Kentucky, but in 1849 was elected to congress; and in 1852 represented the United States in China. From 1855 to 1859 he was again in congress, and in 1860 espoused the confederate cause, and received a general's commission in that army. He was defeated by gen. Garfield at Prestonbury, Jan. 7, 1862; but afterwards fought under the command of gen. Kirby Smith. He was a member of the confederate congress during the latter part of the war, having resigned his commission. The latter part of his life was passed in Louisville in the conduct of a lucrative law practice.

MARSHALL, John, ll.d., 1755–1835; b. Va.; educated at Westmoreland school and by a private tutor. He began the study of law in 1773, but before he was called to the bar the revolution broke out, and he soon joined the *Culpeper minutemen*, a Virginia company, and participated in the battle of Great Bridge, where he led a flanking party. The next year he was transferred to the 11th Virginia regiment as a lieut., and in 1777 he was made a capt. He was with the American army in the New Jersey campaign, and was present at Brandywine, Germantown, and Monmouth. He resigned from the army in 1781, and began to practice law, whose study he had resumed at William and Mary college in the winter of 1779 when he was waiting in Virginia to take command of a new force, which was never raised. He was admitted to practice in 1780. His success at the bar was immediate and marked. In 1782 he was returned to the house of delegates from Fauquier co., and the same year became a member of the executive council. In 1787 he was a member of the legislature from Henrico co., to which he had removed. The next year he sat in the Virginia convention called to ratify or reject the constitution framed at Philadelphia. He and James Madison were the foremost supporters of the new instrument, which they succeeded in carrying through the convention. In 1789, 1790, 1791, Marshall served again in the delegates, this time as member for Richmond. He acted with the federalist party, to which the majority of Virginians were opposed; but he succeeded in retaining the confidence of his political opponents.

In 1792 he resumed his law practice, but in 1795 was again elected to the delegates. Jay's treaty had been most bitterly attacked in Virginia, but was defended by Marshall with such ability that the constitutional points, on which the house of delegates had wished to condemn it, were given up; and the delegates passed a simple resolution of disapproval. Marshall, who, for the sake of his practice, which was now grown very large, had refused from Washington the posts of attorney-gen. and minister to France, consented, after considerable demurrer, to go to Paris in 1797 as envoy extraordinary with gen. Pinckney and Elbridge Gerry. The object of their mission was to induce the French directory to remove the restrictions which it had laid upon American commerce. The negotiations proved fruitless, but the ambassadors were warmly received on their return to America in 1798. A public address was presented to Marshall, and members of both houses of congress united in giving him a public dinner. In 1799, at the urgent solicitation of Washington, he permitted the use of his name as federalist candidate for congress, and was elected by a narrow majority. While the canvass was going on, he had been offered, and had refused, a seat upon the U. S. supreme court. In congress he became the leader of the federal party, which was fast losing popular confidence. He did not support, without reserve, the alien and sedition laws, against which Virginia had resolved to protect herself by force, if necessary. In all other measures he supported the administration. His most notable speech was in the case of Jonathan Robbins, who had murdered a man on a British frigate and escaped to this country. President Adams, in accordance with a provision in Jay's treaty, gave Robbins up to the British government, which claimed him as its subject. Mr. Livingston, for the republicans, introduced into congress a resolution censuring the president for his action. Marshall defended Adams in a powerful speech, showing that the surrender of Robbins was an act distinctly within the political power of the executive. In May, 1800, he was appointed by president Adams secretary of war, but before accepting he was made secretary of state. His instructions to Rufus King, our minister to England, in regard to several important controversies then pending between this country and England, form one of the ablest of American state papers. In 1801 he was nominated and unanimously confirmed chief-justice of the United States. His decisions in the supreme court raised it to a point of public respect and professional reputation which certainly have not since been surpassed. Chief-Justice Marshall's decisions, particularly in the departments of constitutional and commercial law, are of the highest authority. Many judges, more familiar with the books, have sat upon the supreme bench; but none with such an acute and penetrating judicial intellect, or so dispassionate in the hearing of causes. "He was," said one of his admirers, "conscience made flesh, reason incarnate." Between the years 1804 and 1807 appeared his *Life of Washington*, in 5 volumes, founded upon study of original documents then unprinted, and defending the political career of Washington and the measures of his administration from the attacks which both—and, it must be added, Washington's private life—had suffered from the republicans. The book received much adverse criticism from the English reviewers, on account of the alleged impurity of its English and its undue size. It was abbreviated and published in 2 volumes in 1832. Justice Story published, in 1839, a selection from Marshall's decisions and other papers under the name of *The Writings of John Marshall upon the Federal Constitution*. "His judgments," says justice Story, "for power of thought, beauty of illustration, variety of learning, and elegant demonstration are justly numbered among the highest reaches of the human mind." In person and manner Marshall was not graceful, but his amiable and genial character made him a pleasant companion and gained warm friends.

MARSHALL, THOMAS FRANCIS, 1801–64; b. Frankfort, Ky.; nephew of the great chief-justice John. At an early age he began practice in the legal profession, and in 1831 opened an office at Louisville. Here he became noted as an eloquent speaker in political campaigns, and was made judge of the Louisville circuit of the superior court. From 1841 to 1843 he served in congress, where he distinguished himself by his eloquence and ready wit. He was a man of brilliant abilities and attractive personal qualities; but, unfortunately, the highest development of his powers was rendered impossible by habits of dissipation. A collection of his speeches and essays has been published by W. L. Barre.

MARSHALL, WILLIAM CALDER, b. Edinburgh, 1813; studied sculpture at the royal academy, under the instruction of Chantrey and Bailey, where he won a gold medal and traveling scholarship, and from 1836 to 1838 continued his studies in Rome. From the time of his return to London, 1839, he contributed to almost every annual art exhibition some graceful piece of statuary. His work may be classed in three divisions: idealistic statuary, historical sculpture, and decoration. Among his numerous productions in the first class may be mentioned: "The Creation of Adam" (1842); "Christ Blessing Little Children" (1844); "Paul and Virginia" (1845); "Sabrina" (1846), perhaps the most popular of all his figures; "The First Whisper of Love;" and "The Dancing Girl Reposing," which last work gained the art-union prize of £500. In historical figures he has modeled the bronze statue of sir Robert Peel at Manchester, one of Dr. Jenner; and in the Westminster palace, busts of Chaucer, lord Clarendon, and lord Somers. In decoration, he has been extensively engaged in the ornamentation of the new houses of

parliament and the Wellington chapel in St. Paul's cathedral. He was also the designer of the Wellington monument. The style of all his productions is marked by simplicity and refinement, and the conception of his statuettes is especially delicate and poetical.

MARSHALLTOWN, capital of Marshall co., Iowa; at the intersection of the Chicago and Northwestern with the Central railroad of Iowa; pop. '70, 4,384. It is the center of a prosperous agricultural region, has 7 churches, 3 banks, 3 public schools, a public library, 3 newspapers, 2 flouring-mills, 2 breweries, 3 grain elevators, and a foundry.

MARSHALSEA PRISON, in Southwark, London, was built in the 12th century. It was for a long time a king's bench prison, but finally used for confining poor debtors. It was broken open by the Gordon rioters in 1780. It was abolished, with the ancient Marshalsea courts, in 1849, and has since been torn down.

MARSH-GAS, or METHANE, also called light carbureted hydrogen and fire-damp. It is generated in muddy bottoms of pools in which water-plants grow. When the mud is stirred bubbles of gas rise to the surface, and are easily collected in an inverted bottle. This gas is a mixture of methane and carbonic acid; the latter is readily removed by agitation with limewater or caustic potash or soda. It is also often disengaged in coal mines, sometimes issuing in streams from fissures, having been pent up in the coal. It is one of the products of the distillation of coal in making illuminating gas. Its formula is CH_4, and it contains 12 parts of carbon and 4 parts of hydrogen, by weight. Its specific gravity is 0.559, having a little more than half the density of common air. Containing, as it does, a large proportion of hydrogen, it forms, when mixed with oxygen, a highly explosive compound. Mixed with common air it is also very explosive, as the terrible accidents in coal mines have unhappily demonstrated. It was a long time before marsh gas could be obtained pure by artificial means. That contained in coal gas and made by passing alcohol through a red-hot tube is exceedingly difficult of separation. Dumas, however, has discovered a method by which it can be readily procured in large quantities, perfectly pure. A mixture is made of 40 parts of crystallized acetate of soda, 40 parts of caustic soda, and 60 parts of quicklime in powder, strongly heated in a retort. The gas is given off in great abundance and may be collected over water. The reaction is as follows: $NaC_2H_3O_2+NaHO=CH_4+Na_2CO_3$. It will be perceived that lime does not enter as an element in this calculation. It is introduced only to prevent the soda from attacking the glass of the retort.

MARSH-HAWK. See HARRIER, *ante*.

MARSH-HEN. See RAIL, *ante*.

MARSH-MALLOW, *Althæa*, a genus of plants of the natural order *malvaceæ*, differing from the true mallows chiefly in the 6 to 9 cleft outer calyx. The species, which are not numerous, are annual and perennial plants, with showy flowers, natives of Europe and Asia. Only one, the COMMON MARSH-MALLOW (*A. officinalis*), is an undoubted native of Britain, and is common only in the south, growing in meadows and marshes, especially near the sea. It has a stem 2 to 3 ft. high, entire or 3-lobed leaves, both leaves and stem densely clothed with soft, starry down, and large, pale, rose-colored flowers on short 3 to 4 flowered axillary stalks. Lozenges made from it (*pâtes de guimauve*) are in use. The whole plant is wholesome, and in seasons of scarcity, the inhabitants of some eastern countries often have recourse to it as a principal article of food. It is said to be palatable when boiled, and afterwards fried with onions and butter. The hollyhock (q.v.) is commonly referred to this genus.

MARSHMAN, JOSHUA, D.D., an English missionary; 1767–1837; b. at Westbury-Leigh, Wiltshire. While young he showed a great passion for reading. His parents being poor, he was obliged to struggle for an education. In 1794 he became master of a school in Bristol, and at the same time a student of Bristol academy, where he studied Latin, Greek, Hebrew, and Syriac. Deciding to devote his life to the missionary work, he was sent in 1799 by the Baptist missionary society to India to join Carey and his colleagues. The East India company being opposed to missions in their territories, they established their mission at Serampore, a town on the Hoogley, 16 m. above Calcutta, containing a mixed population of Danes, Dutch, English, and natives. Finding soon after his arrival the support granted by the society insufficient for the wants of the colony, he, with the aid of his wife, opened two boarding-schools for European children, and shortly after a school for natives, which was soon filled, and the income from this enterprise, supplemented by that of Carey as instructor in the government college at Fort William, enabled them soon to make their mission independent of home support. But their course did not meet the approval of the committee of the society, who censured without sufficient information, pinched the mission, and dictated their management. Some American subscribers remonstrated "against any part of their contributions for training young men to the ministry being employed in teaching science." This disagreement continued for some time, threatening the success of the enterprise. In 1822 Dr. Marshman sent his son John to England to endeavor to restore amicable relations, which mission being unsuccessful, he himself in 1826 returned in order to confer with the society. But he failed in his object, and the matter ended in a separation of the Serampore mission from the society. He returned in 1829 to Serampore. He had experienced a great affliction in the death from cholera of Mr. Ward, with whom he and Dr. Carey

had labored for 23 years. The treatment of the parent society deeply distressed him. He became very melancholy, wandering about unable even to write a letter. In 1834 Dr. Carey died, leaving him alone. In 1836 his daughter, who had married the famous Christian soldier, gen. Henry Havelock, barely escaped with her life from her bungalow, which had caught fire, losing one of her three children in the flames. Soon after Dr. Marshman died from complete nervous prostration. A few days before his death arrangements were made in London for the reunion of the Serampore mission with the parent society, and the retention of Dr. Marshman as superintendent. In addition to his special missionary duties, Dr. Marshman gave himself with great zeal to the study of the Bengalee, Sanskrit, and Chinese languages, which he mastered. He translated into Chinese the book of Genesis, the four Gospels, the epistles of Paul to the Romans and Corinthians. He published also a *Dissertation on the Characters and Sounds of the Chinese Language; The Works of Confucius, containing the Original Text, with a Translation; Clavis Sinica; Elements of Chinese Grammar, with a Preliminary Dissertation on the Characters and Colloquial Medium of the Chinese.* He assisted Dr. Carey in preparing a Sanskrit grammar and a Bengalee and English dictionary. Rammohun Roy having assailed the miracles of Christ in a work entitled *The Precepts of Jesus the Guide to Peace*, Dr. Marshman replied in a series of articles in the *Friend of India* (a periodical issued by the Serampore missionaries), subsequently republished in a volume under the title of *A Defense of the Deity and Atonement of Jesus Christ.* Rammohun Roy replied to this.

MARSH-MAR'IGOLD, *Caltha*, a genus of plants of the natural order *ranunculaceæ*, having about 5 petal-like sepals, no petals, and the fruit consisting of several spreading, compressed, many-seeded follicles. *C. palustris* is a very common British plant, with kidney-shaped, shining leaves, and large yellow flowers, a principal ornament of wet meadows and the sides of streams in spring. It partakes of the acridity common in the order; but the flower-buds, preserved in vinegar and salt, are said to be a good substitute for capers.

MARSH-ROSEMARY, the *statice limonium*, variety *Caroliniana*, natural order *plumbaginaceæ*, a perennial plant, growing in salt marshes along the sea-shore of southern and western Europe. The variety *Caroliniana* is an American plant, growing in similar localities on the American coast. Extending northward along the coast of British America, it passes into *S. bahusiensis.* Marsh-rosemary has a tuft of spatulate-oblong, bristly pointed, one-ribbed leaves, developing in August, a much-branched, panicled scape, from 1 to 2 ft. high, bearing numerous small lavender-colored flowers; fruit, a one-seeded utricle, contained in the base of the calyx. The root is used in medicine. Edward Parrish found it to contain about 12 per cent of tannin, a trace of volatile oil, a little caoutchouc-like matter, gum, and other vegetable principles. Chlorides of sodium and magnesium, and sulphates, are among the inorganic constituents. Marsh-rosemary was long ago a celebrated remedy for hemorrhages, and in recent times has been used for gargles in ulcerated sore throats.

MARSH'S TEST. See ARSENIOUS ACID.

MARSI, an ancient tribe of central Italy, inhabiting the district around the lake Fucinus (*Lago di Celano*). Their origin, like that of other Italian tribes, is involved in obscurity and fiction. They were probably of Sabine origin. They are worthy of notice chiefly on account of their warlike spirit. The Marsians were at one time allies of the Romans, but, in 308 B.C., they revolted and joined the Samnites. After being subdued they again, 301 B.C., shook off the alliance of Rome, but were beaten in the field, and lost several of their fortresses. From this time they continued the firm allies of Rome, contributing by their valor to her triumphs until the Italians were aroused in 91 B.C. to demand a redress of their wrongs and a share in the privileges of Roman citizens. A war ensued, generally known as the social war, but frequently called the Marsic war, because the Marsi were prominent among the malcontents. Their leader was Silus Pompædius. Though often defeated, their perseverance gained the object for which they had taken up arms in 87 B.C. The Marsians, inhabiting a mountainous district, were simple and temperate in their habits, but hardy, brave, and unyielding. So marked was their valor that there was a proverbial saying recorded by Appian, "that Rome had achieved no triumph *over* the Marsi, or *without* the Marsi." The ancient Marsi were represented as enchanters, able to tame serpents and to heal their bites; and it is worthy of note that the jugglers who now amuse the people by handling serpents are natives of the region in the vicinity of *Lago di Celano.* Their only important town was *Marruvium* (San Benedetto), the ruins of which are visible on the east shore of the lake

MAR'SICO NUO'VO, a t. in the Italian province of Potenza, 18 m. S. of the town of Potenza, built on a height, and exposed to violent winds. Pop. '72, 6,125.

MARSILEA'CEÆ, or RHIZOCARPEÆ, a natural order of acotyledonous plants, nearly allied to *lycopodiaceæ*, but differing in the want of a stem, and in the usually stalked leaves. The species are all inhabitants of ditches and pools, chiefly in temperate regions, and two of them occur in various parts of Great Britain. No species was known to be of any importance till the discovery of the nardoo (q.v.) of Australia.

MARSIPOBRANCH'II, the second of the six orders of fishes instituted by Huxley, including the lampreys and the hag-fishes. They are the dermopterous fishes of Owen. See HAG; LAMPREY; *ante*.

MARSIVAN', or MARSOVAN, a village of Asia Minor, in the pashalic of Sivas, and 120 m. n.w. of the town of that name, in a wide undulating plain. Marsivan is a post station of the first class, has many mosques and fountains, and some manufactures of cotton stuffs. Its Greek name is Merziphone.

MARS-LA-TOUR, a village and commune of France, 15 m. from Metz, on the route between Metz and Verdun; pop. 652. It is a manufacturing place of woolens, hard ware, oils, and dye-stuffs. Lumber and grain also are products. In the 15th c. it had a fortified chateau. On Aug. 16, 1870, it was the scene of the bloody battle of Gravelotte between the French and the Germans.

MARSTON, GILMAN, b. in Oxford, N. H., about 1815; graduated at Dartmouth college in 1837, and at the Cambridge law-school in 1840; settled at Exeter, N. H., in 1841; was a member of congress, 1859–63 and 1865–67. He served with distinction in the war for the union, first as col. of the 2d New Hampshire, and afterwards as a brig.gen. of volunteers.

MARSTON, JOHN, 1575–1634; b. England; educated at Corpus Christi college, Oxford, according to Anthony Wood, though this, like many other points in the poet's life, is doubtful. He is satirized under the name of Demetrius in Ben Jonson's *Poetaster*, 1601. The hostility between the two poets seems to have been at an end in 1605, when Marston dedicated to Jonson his play of *The Malcontent*. The same year he joined with Jonson and George Chapman in the authorship of *Eastward Hoe*. James I. imprisoned the three authors on account of some satire which the play contained against the Scotch. Soon after their release the ill-feeling between Jonson and Marston broke out again, for the latter, in the preface to *Sophonisba*, 1606, taunts Jonson with his plagiarisms from Latin writers, and Jonson, in a conversation with Drummond of Hawthornden refers to an enmity of long-standing between himself and Marston. The other works of Marston are: *The Metamorphosis of Pigmalion*, 1598; *Antonio and Mellida*, a tragedy, 1602; *Antonio's Revenge*, a tragedy, 1602; *The Dutch Courtesan*, a comedy, 1605; *Parasetaster*, a comedy, 1606; *What You Will*, a comedy, 1607; *The Insatiate Countess*, a tragedy, 1613; and *The Scourge of Villanie*, a satire of great power. His miscellaneous poetical works were collected and published by Mr. Bowle in 1764.

MARSTON, WESTLAND, LL.D., b. England, 1820; studied law, but left it for literature. He was at one time an editor of the *National Magazine*, and an occasional contributor to the *Athenæum*. He has published *Gerald and other Poems* (1842); a novel called *A Lady in her own Right* (1860); and a collection of stories called *Family Credit and other Tales* (1861). His principal literary activity, however, has been in the direction of dramatic literature, and of his numerous plays we may mention *The Patrician's Daughter*, a tragedy (1841); *The Heart and the World* (1847); *Ann Blake* (1852); *The Favorite of Fortune*, a comedy produced at the Haymarket theater in 1866; *A Hero of Romance* (1867); and *Life for Life*, a play in blank verse, produced at the lyceum theater in 1868, and whose principal character was played by the late Adelaide Neilson.

MARSTON MOOR, a plain in Yorkshire, England, where, July 2, 1644, the royalist force, under prince Rupert, was beaten by the parliamentary forces, English and Scotch, under Fairfax and the earl of Leven. The approach of Rupert forced Fairfax to abandon the siege of York, and he took up his position on Marston Moor, with about 25,000 men. Rupert, with about the same number, came up with him on the afternoon of July 2. It was not till about 7 o'clock that the battle, which had up to this time been little more than a desultory cannonade, began in earnest. Rupert, at the front of the royalist right, made a fierce charge upon the parliamentary left, which broke and fled in disorder. The parliamentary center had likewise been broken by the infantry royalist center, and had suffered heavily. The battle seemed irretrievably lost to the parliamentary leaders, who left the field. But while the royalists were dispersed in search of plunder or in pursuit of the enemy, Cromwell's famous "Ironsides" brigade, with the Scotch regiments, commanded by David Leslie, and some others, rallied, charged the royalists vigorously, and remained masters of the field, capturing 1500 prisoners and all the royalist artillery. The killed and wounded on each side numbered about 2,000. This victory resulted in the occupation of York and the control of the whole north of England by the parliamentary force.

MARSTRAND, WILHELM, 1810–73; b. Copenhagen; studied art there, at Munich, and at Rome. He attained high rank by his *genre* paintings, and became a professor and director of the Copenhagen academy. His most meritorious works are, perhaps, "Return of a Society from a Popular Festival," and "Erasmus Montanus."

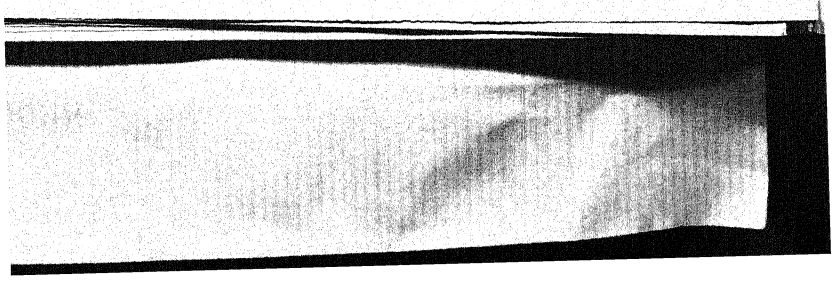
MARSUPIA'LIA, or MARSUPIA'TA, an extensive order or group of mammals, differing essentially from all others in their organization, and especially in their generative system. The animals of this aberrant group originally received the name of *animalia crumenata*, or purse-bearing animals; and the names now employed have a similar signification, being derived from *marsupium*, a pouch or bag. This marsupium, or pouch, which is situated on the abdomen of the female, contains the teats, and serves for the protection

of the immature young; and is unquestionably the most marked characteristic of these animals. As the different genera of this order live upon various kinds of food—some being herbivorous, others insectivorous, and others, again, purely carnivorous—we find various modifications of their organs of progression, prehension, and digestion; but as the most important of these modifications are noticed in the articles on the principal genera, we shall confine ourselves to the characters common to the group.

The leading peculiarity presented by the skeleton is the presence of the marsupial bones (see MAMMALIA), which are attached to the pubis, and are imbedded in the abdominal muscles. Another constant but less striking peculiarity is a greater or less inversion of the angle of the lower jaw. The organs of digestion, including the teeth, vary extremely, according to the nature of the food; a complex stomach and a cæcum of considerable size being present in some, while others (the carnivorous genera) have a simple stomach and no cæcum. The brain is constructed on a simpler type than in the placental mammals. The size of the hemispheres is so small that they leave exposed the olfactory ganglion, the cerebellum, and more or less of the optic lobes, and they are but partially connected together by the "fornix" and "anterior commissure," the great cerebral commissure known as the "corpus callosum" being absent. In accordance with this condition of the brain, these animals are all characterized by a low degree of intelligence, and are said (when in captivity) not to manifest any sign of recognition of their feeders. It is, however, in the organs of generation and mode of reproduction that these animals especially differ from all the ordinary mammals. Professor Owen, who has done more to elucidate this subject, and indeed the anatomy and physiology of marsupiata generally, than any other anatomist, observes that in all the genera of this order the uterus is double, and the introductory passage more or less (sometimes wholly) separated into two lateral canals. Both the digestive and generative tubes terminate within a common cloaca (q.v.), and there are various other points in which these animals manifest their affinity to the oviparous vertebrates. The marsupial bones serve important purposes in connection with their generative economy. "In the female," he observes, "they assist in producing a compression of the mammary gland necessary for the alimentation of a peculiarly feeble offspring, and they defend the abdominal viscera from the pressure of the young as these increase in size during their marsupial existence, and still more when they return to the pouch for temporary shelter," while in the males they are subservient to the reproductive process. The marsupials belong to the *aplacental* division of the mammalia (q.v.). The period of their gestation is short (26 days in the Virginian opossum, and 39 days in the kangaroo), and the young are produced in so immature a state that the earlier observers believed that they were produced like buds from the nipples to which they saw them attached. The appearance presented by a young kangaroo of one of the largest species, within 12 hours of its being deposited in the pouch, is described by professor Owen (from personal observation in the zoological gardens) as follows: "It resembled an earthworm in the color and semi-transparency of its integument, adhered firmly to the point of the nipple, breathed strongly but slowly, and moved its fore-legs when disturbed. The body was bent upon the abdomen, its short tail tucked in between the hind-legs, which were one-third shorter than the fore-legs. The whole length from the nose to the end of the tail, when stretched out, did not exceed one inch and two lines." The mother apparently employs her mouth in placing the young at the nipple, where it remains suspended, involuntarily absorbing milk for a considerable time (probably about two months on an average), after which it sucks spontaneously for some months. Although able from the first, by the muscular power of its lips, to adhere firmly to the nipple, it does not possess the strength to obtain the milk by the ordinary process of sucking. In the process it is assisted by the adaptation of a muscle to the mammary gland, which, by contracting, injects the milk from the nipple into the mouth of the adherent fetus; and to prevent the entrance of milk into the air-passage, the larynx is prolonged upwards to the aperture of the posterior nares, where it is closely embraced by the muscles of the soft palate. The air-passage is thus entirely separated from the throat, and the milk passes on either side of the larynx into the esophagus.

Professor Owen has proposed that these animals should be divided into five tribes or primary groups, viz., *sarcophaga, entomophaga, carpophaga, poephaga,* and *rhizophaga,* according to the nature of their food. With the exception of one American and one Malayan genus, all known existing marsupials belong to Australia, Tasmania, and New Guinea.—For further details regarding this order, the reader is referred to Waterhouse's *Natural History of the Mammalia*, vol. i., and to Owen's article "Marsupialia" in the *Cyclopædia of Anatomy and Physiology.*

MARSUPIALIA (*ante*), one of the two orders of non-placental mammals, including the opossum and kangaroo. The other order, *monotremata* (q.v.), includes the *ornithorhynchus*, duck-mole or duck-bill (q.v.). The marsupialia, with the exception of the genus *didelphys* (opossums), are exclusively natives of Australia, Van Diemen's Land, New Guinea, and neighboring islands. They are divided into two primary sections, *diprotodontia* and *polyprotodontia.* Diprotodontia contains three sub-sections: 1. *Rhizophaga*, containing the wombat, a stout, heavy animal 2 or 3 ft. long, having curved, digging claws upon the fore-feet, and a dentition resembling that of the herbivorous rodents. There are two incisors in each jaw, growing from permanent pulps. There are no



canines, and the incisors and premolars are separated by a considerable space. Dental formula: *i.*, $\frac{1-1}{1-1}$; *c.*, $\frac{0-0}{0-0}$; *pm.*, $\frac{1-1}{1-1}$; *m.*, $\frac{4-4}{4-4}$=24. It is nocturnal in habits, feeding upon roots and grass in Australia and Tasmania. 2. *Poephaga.* This section contains the kangaroo (q v.) (*macropodidæ*) and the kangaroo-rat (*hypsiprymnus*). The kangaroo-rats differ from the true kangaroo in their smaller size and well-developed upper canines, and also in having scaly tails, like the opossums. The dental formula of the kangaroo is: *i.*, $\frac{3-3}{1-1}$; *c.*, $\frac{0-0}{0-0}$; *pm.*, $\frac{1-1}{1-1}$; *m.*, $\frac{4-4}{4-4}$=28. 3. *Carpophaga.* The typical animals of this section are the phalangers, so called from the fact that the second and third digits of the hind-feet are united almost to their extremities (see PHALANGER and FLYING-PHALANGER, *ante*). Intermediate between the phalangers and the kangaroos is the kangaroo-bear of the colonists, or the *koala* (q v.) or *phascolarctos*, whose dental formula is. *i.*, $\frac{3-3}{1-1}$; *c.*, $\frac{1-1}{0-0}$; *pm.*, $\frac{1-1}{1-1}$; *m.*, $\frac{4-4}{4-4}$=30.

The second primary section, polyprotodontia, contains two sub-sections. 1 *Entomophaga,* which contains the bandicoot (q.v.), the opossum (q.v.), and the banded ant-eater. The dental formula of the bandicoot is: *i.*, $\frac{5-5}{3-3}$; *c.*, $\frac{1-1}{1-1}$; *pm.*, $\frac{3-3}{3-3}$; *m.*, $\frac{4-4}{4-4}$=48. The dental formula in the opossum is: *i*, $\frac{5-5}{4-4}$; *c.*, $\frac{1-1}{1-1}$; *pm.*, $\frac{3-3}{3-3}$; *m.*, $\frac{4-4}{4-4}$=50. The banded ant-eater, *myrmecobius fasciatus*, is a small, rather pretty animal of south-western Australia, differing from the other *didelphidæ* in not having a prehensile tail. The fore-feet have five toes, while the hind-feet have but four each. It has a number of light and dark bands across its back. These animals are remarkable for the number of their molar teeth, having more than any other marsupial and exceeded only by some of the armadillos. Their dental formula is: *i.*, $\frac{4-4}{3-3}$; *c.*, $\frac{1-1}{1-1}$; *pm.*, $\frac{3-3}{3-3}$; *m.*, $\frac{6-6}{6-6}$=54. 2. *Sarcophaga.* This sub-section includes a number of animals which, unlike most of the order, are carnivorous and very rapacious. The best known are *thylacinus cynocephalus,* or the Tasmanian wolf (see THYLACINE, *ante*), the *dasyurus ursinus,* or ursine opossum, also called "devil," "wildcat," and "hyena" by the settlers (see DASYURE, *ante*), and also the *dasyurus macrurus,* or long-tailed dasyure, sometimes erroneously called the spotted marten, a name given to it in Phillips's *Voyage.* It somewhat resembles the weasel and marten in form, but is more clumsy, although exceedingly vigorous, active, and ferocious. They were very troublesome to the first settlers, as was also the ursine opossum, or "devil," committing various depredations.

The marsupials are regarded as the earliest developed mammals whose fossils have been discovered, although there is some uncertainty. The oldest known European mammal is the *microlestes antiguus* of the upper triassic formation, only the teeth of which have been found, and it is believed to have been a marsupial and related to the banded ant-eater. The two jaw-bones of an allied animal were found in the trias of North America by Prof. Emmons several years ago, and in the opinion of Prof. Owen they belonged to an insectivorous marsupial also allied to the banded ant-eater. In the stone-field slate of the lower oolitic formation a great share of the mammalian remains belong to the small marsupials. In the upper oolite the remains are chiefly marsupial, of the size of a hedgehog and smaller. Fossil marsupialia, allied to the opossum, have been found in Europe in eocene and miocene, and also in the upper Jurassic of North America.

MAR'SUPITES, or TORTOISE ENCRINITES, a genus of extinct crinoids, established by Miller, and found only in the cretaceous formation. The calyx is of large size and the center of its base consists of a single plate, which may be regarded as the uppermost segment of a stem, although the animal is not pedunculated or attached. The pelvis, therefore, resembles a plated pouch surrounded by two cycles of radials. See CRINOIDEÆ, *ante.*

MAR'SYAS, in legend, a Phrygian satyr who entered into a musical competition with Apollo, under an agreement that the defeated contestant should be at the mercy of the winner. The Muses were selected as judges, and awarded the superiority to Apollo, who accompanied his lyre with the voice, while Marsyas played upon the pipe which had been thrown away by Athene. Apollo flayed Marsyas alive, and the tears of the rural divinities for the satyr were said to have formed the river named after him, which flows into the Mæander. The subject was a favorite one with the ancient sculptors.

MARTABAN', the name of a small t. in the province of Pegu, in British Burmah, on the banks of the river of the same name, and near its mouth in the gulf of Martaban, in lat. 16° 32′ n., long. 97° 35′ e., was the first that fell into the hands of the British in the Burmese war in 1852

MARTEL, CHARLES. See CHARLES MARTEL.

MARTELLO TOWERS are round towers for coast defense, about 40 ft. high, built most solidly, and situated on the beach. They occur in several places round the coast

of the United Kingdom; but principally opposite to the French coast, along the southern shore of Kent and Sussex, where, for many miles, they are within easy range of each other. They were mostly erected during the French war as a defense against invasion. Each had walls of 5½ ft. thickness, and was supposed to be bomb-proof. The base formed the magazine; above were two rooms for the garrison, and over the upper of these the flat roof, with a 4½-ft. brick parapet all round. On this roof a swivel heavy gun was to be placed to command shipping, while howitzers on each side were to form a flanking defense in connection with the neighboring towers. Although the cost of these little forts was very great, they are generally considered to have been a failure; their armaments have mostly been removed, and their garrisons of 6 to 12 pensioner-soldiers replaced by coast-guard men, or in some cases by old master-gunners.

The name is said to be taken from Italian towers built near the sea, during the period when piracy was common in the Mediterranean, for the purpose of keeping watch and giving warning if a pirate-ship was seen approaching. This warning was given by striking on a bell with a hammer (Ital. *martello*), and hence these towers were called *torri da martello*.

MARTEN, *Martes*, a genus of digitigrade carnivorous quadrupeds of the family *mustelidæ*, differing from weasels in having an additional false molar on each side above and below, a small tubercle on the inner side of the lower carnivorous cheek-teeth, and the tongue not rough—characters which are regarded as indicating a somewhat less extreme carnivorous propensity. The body is elongated and supple, as in weasels, the legs short, and the toes separate, with sharp, long claws. The ears are larger than in weasels, and the tail is bushy. The martens exhibit great agility and gracefulness in their movements, and are very expert in climbing trees, among which they generally live. Two species are natives of Britain—the COMMON MARTEN, BEECH MARTEN, or STONE MARTIN (*M. foina*), and the PINE MARTEN (*M. abietum*), inhabiting chiefly the more rocky and wooded parts of the island; the former in the s., and the latter in the north. Both were once much more common than they now are, being sought after on account of their fur, and killed on every opportunity, because of their excessive depredations among game and in poultry-yards. The head and body are about 18 in. long, the tail nearly 10 inches. Both species are of a dark tawny color, the common marten having a white throat, and the pine marten a yellow throat. Many naturalists regard them as varieties of one species, of which also they reckon the sable (q.v.) to be another variety. The fur of the martens is of two sorts: an inner fur, short, soft, and copious, and long outer hair, from which the whole fur derives its color. The common marten is much less valuable for its fur than the pine marten, whilst the pine marten is much less valuable than the sable; but skins of the common marten are imported in great numbers from the n. of Europe, and they are often dyed, and sold as an inferior kind of sable. Pine marten skins are imported from the n. of Europe, Siberia, and North America.—The martens generally have their retreats in the hollow trunks of trees, or usurp the nest of a magpie or other bird, but sometimes among rocks. They are capable of a certain amount of domestication.

MARTENSEN, HANS LASSEN, D.D., b. at Flensborg, Denmark, Aug. 19, 1808; studied theology at the university of Copenhagen; and in 1840 became professor at the university, first in philosophy, and afterwards in theology. In the same year appeared his first book, *Meister Eckart*, which was an essay on the mysticism of the middle ages. It was received with much enthusiasm both in Denmark and Germany. In 1841 appeared his *Outline of a System of Ethics*, followed, in 1849, by *Christian Dogmatics*. In the latter the author, as a disciple of Hegel, undertakes to reconcile faith and reason, revelation and science—a task which he performed with such acuteness and ingenuity as to excite the admiration of Christian readers in many countries. In 1845 he was appointed preacher to the Danish court, and in 1853 elevated to the bishoprick of Sealand, the highest dignity of the Danish church. In this position, by his eminent scholarship, his catholic spirit, and his tireless activity, he has exerted a powerful and beneficent influence. In 1872 he published a *System of Christian Ethics*.

MARTEN, SPOTTED, or LONG-TAILED DASYURE. See MARSUPIALIA.

MARTHA'S VINEYARD, an island on the s. coast of Massachusetts, 21 m. long, 6 m. in average width. Edgartown, settled in 1642 by emigrants from Southampton, England, is the largest town. The island has lately been noted for annual camp-meetings attended by 20,000 persons. Pop. '70, 3,688.

MARTHA'S VINEYARD (*ante*), an island 20 m. in length and 3 to 9 m. wide, off the s.e. coast of Massachusetts, is a part of Duke's co., and is separated from Barnstable co. by Vineyard sound, 3½ to 7 m. in width; pop. '70, 3,678. It was discovered by Bartholomew Gosnold in 1602; and at that time was heavily wooded, and contained deer and other game, berries and fruits in profusion, a fresh-water lake, springs, and many wild vines. Gosnold at first gave the name, doubtless in memory of some friend, to a barren islet (No Man's Land) lying s.w. of the larger island to which he afterwards transferred the name. At the period of its discovery, Martha's Vineyard was found to be valuable on account of its growth of sassafras, which was highly esteemed in Europe as a medicine, and of which cargoes were carried away from the island and the main-

'and. In 1647 Thomas Mayhew, who had become governor of this island in 1641, by grant from the earl of Stirling, settled where Edgartown now stands, and where the Mayhew family remained in control until 1710. Members of this family conducted missionary enterprises on the island, among the natives, with great zeal and earnestness, and with such success that Christian villages abounded. The new converts proved their devotion by guarding the island during the progress of king Philip's war; but later on they gradually died out. In 1835 the island of Martha's Vineyard was first used for the purposes of a camp-meeting, 9 tents being pitched on the site of the present camp-ground. This institution continued to thrive until it had grown to its present importance and comprehensive scope. Of late years, the annual gathering for religious purposes has numbered as many as 25,000 persons, the meeting occurring in August, in a large grove of shade-trees. Here a settlement of tasteful cottages has grown up, the site being laid out in streets, lighted at night, and at such a time presenting a scene of fairy splendor. It has become a place of fashionable resort, families from Boston and other cities occupying the cottages during the season. East of the camp-grounds a ledge of bluffs extends along the edge of the shore, overlooking the sea from a height of about 30 feet. Here the village of Oak Bluffs was laid out in 1868, and has since become a fashionable watering-place, visited in the season even from so far s. as New York and Philadelphia. Oak Bluffs is connected with Edgartown by a narrow-gauge railroad. Twenty m. distant, at the w. end of the island, is Gayhead, an abrupt and bold coast-line eminence, which is said to be of volcanic origin. Six m. e. of Oak Bluffs is Edgartown (q.v.), the principal town on the island; and beyond this is Katama bay, which is a place of resort for social entertainment, and has attractions in its beautiful scenery. The island is accessible by steamer from New Bedford and Wood's Holl.

MARTIAL (MARCUS VALERIUS MARTIALIS), the first of epigrammatists, was b. at Bilbilis, in Spain, 43 A.D. In 66 he came to Rome, where he resided till 100, when he returned to his native town. There he married a lady called Marcella, on whose property he lived till his death (about 104). When at Rome he soon became famous as a wit and poet, received the patronage of the emperors Titus and Domitian, and obtained from them the privileges of those who were fathers of three children, and, in addition, the rank of tribune and the rights of the equestrian order. He lived, seemingly, in affluence in a mansion in the city, and in Nomentum, a suburban villa, to both of which he makes frequent reference. From Rome his reputation rapidly extended to the provinces; and even in Britain his *Epigrammata*, which, divided into 14 books, now form his extant works, were familiarly read. These books, which were arranged by himself for publication, were written in the following order: the first 11 (including the *Liber de Spectaculis*) were composed at Rome, with the exception of the third, which was written during a tour in Gallia Togata; the 12th was written at Bilbilis, and the 13th and 14th at Rome, under Domitian. The last two, entitled *Xenia* and *Apophoreta*, describe, in distichs, the various kinds of *souvenirs* presented by the Romans to each other on holidays. To the other books we are also indebted for much of our knowledge of the manners and customs which prevailed under the emperors Nero, Galba, Otho, Vespasian, Titus, Domitian, Nerva, and Trajan, under whose collective reigns he spent 35 years of his life. His works have also a great literary value, as embodying the first specimens of what we now understand by epigram—not a mere inscription, but a poem of two or more lines, containing the terms of an antithesis, which goes off with a repercussion at the close. The wonderful inventiveness and facility displayed by Martial in this species of composition have always received the highest admiration, only qualified by his disgusting grossness, which, blameworthy in him, was even more so in the age by which it was demanded and relished. The best edition of Martial is that of Schneidewin. He has never found an adequate translator.

MARTIAL LAW is a collective name for those laws to which the individuals composing the military and naval forces of a country are subject, but which do not apply to civilians. As, however, the soldier remains a citizen, he is governed by the common law in all matters not coming under the cognizance of the martial law, the degree to which the latter is applicable to his actions varying in different countries, and in times of peace and war. In France and Austria a soldier's offenses against the civil code are dealt with by a court-martial; while among British troops—unless serving against an enemy—the civil tribunals deal with non-military offenses.

The maintenance of discipline and other obvious causes necessitate, for a body of armed men, a code of laws and regulations much more strict and severe in their penalties, as well as more prompt in their execution, than suffices for ordinary society. Accordingly there have always been martial laws, more or less clearly defined, where there have been armies. For the nature of the rules under which the discipline of the British army is kept up, see ARTICLES OF WAR and MUTINY ACT.

There is yet another phase of martial law, and that is the degree of severity which may be applied to an enemy. All authorities agree that the life of an enemy taken in arms is forfeit to his captor; but modern ideas preclude his being put to death, unless in open resistance; and the massacre of prisoners in cold blood, once thought lightly of, is now esteemed a barbarity, which nothing but the most urgent circumstances, such as their uprising, or their attempted rescue by their countrymen, could justify. The

slaughter of the captive Mamelukes at Jaffa has left an indelible stain on Napoleon's memory. As regards civil population and property, much amelioration has taken place with advancing civilization. Formerly the devastation of the country, and the destruction, accompanied even by torture, of the inhabitants, was deemed a legitimate feature of war. Now, the rule is to spare private property, to respect personal liberty, unless the inhabitants directly or indirectly aid the enemy, and only to lay waste so much ground as military necessities may require. Such at least is the principle professed; but few commanders are able to prevent their troops from deeds of violence. A province occupied by a hostile army is usually considered "under martial law." This means that civil law is defunct, and all government under military regimen; but it is impossible to define the bounds of this martial law; nor is any more correct dictum on the subject likely to be arrived at than that celebrated saying of the duke of Wellington when he described it as "the will of the commander-in-chief."

MARTIAL LAW (*ante*) must be distinguished from both military law and military government. The last denotes the rule of a conquered or insurrectionary district by military authority, while military law is that branch of the law which regards military discipline and the government of persons employed in the military service. Martial law, says Kent, supersedes and suspends the civil law, but military law is superadded and subordinate to the civil law. As good a definition as any of martial law, which is in its nature somewhat indefinite, is that given by prof. Joel A. Parker, in the *North American Review*, Oct., 1861. "It is," he says, "that military rule and authority which exists in time of war, and is conferred by the laws of war, in relation to persons and things under and within the scope of active military operations, in carrying on the war; and which extinguishes or suspends civil rights and the remedies founded on them, for the time being, so far as it may appear to be necessary, in order to the full accomplishment of the purposes of war." It will be seen that martial law is in the highest degree arbitrary and capable of abuse. It may be decreed at will by competent military authority, and the only rule as to the propriety of its being established is the test of necessity. The duke of Wellington, from his place in the English house of lords, deprecated its employment, except under the most urgent pressure, and then only with great modifications.

In a celebrated Ceylon case the late lord chief-justice Cockburn was very reluctant to admit that civil law could be superseded by court-martial, *except* where, as in India, the military government was absolute; but in the same case Blackburn, J., laid down the dictum universally accepted in the United States, that martial law is derived from statutory provisions and founded on paramount necessity. Thus the question as to its *nature* is closely connected with the *manner* of its exercise, and this again with the *responsibility* for such exercise. As to its extent, we may refer to a decision of the U. S. supreme court in the case of *Neal Dow* v. *Bradish Johnson*, October term, 1879. It was *held:* that an officer of the United States, while in service in an enemy's country, was not liable to an action in civil courts for acts done in pursuance of a superior's orders; and when any portion of an enemy's country was in the military possession of the United States, the municipal laws were to be continued in force and administered through the ordinary channels for the protection and benefit of the inhabitants and others not in military service, but not for the protection or control of army officers or soldiers. In the supreme court of Missouri it has been held that the act of congress making the order or authority of the president a good defense for acts done or left undone during the rebellion, is unconstitutional (64 Mo., 564). Where an inferior confederate officer, under the orders of his superior, destroyed large quantities of spirits to preserve the discipline of his command, the courts of Mississippi held that such order was no defense in an action for damages brought after the close of the war.

The whole subject of the relations of the civil and military authorities in time of war, and especially the constitutionality of acts passed distinctly as war measures, is of great interest, and, while much may be *res judicata*, there are many points not yet clearly determined.

MARTIGNY, or MARTINACH (the *Octodurus* of the Romans), a small t. of Switzerland, in the canton of Valais, is situated on the Drance, an affluent of the Rhone, about 24 m. s.s.e. from the e. end of the lake of Geneva. The two noted routes, one to the vale of Chamouni by the Tête Noire or the Col de Balme, and another to the great St. Bernard, branch off here. Martigny is on the Simplon road into Italy. It is a great resort for tourists, and has a population of about 1200.

MARTIGUES, a small t. of France, in the department of Bouches du Rhone, is situated on three islands, united by bridges, in the entrance to the Etang de Berre, 16 m. n.w. of Marseilles. From the peculiarity of its position, it has been called the Provençal Venice. Pop. '76, 4,959, engaged in the tunny and pilchard fisheries.

MARTIN. See SWALLOW.

MARTIN, a co. in s.w. Indiana, intersected by the Ohio and Mississippi railway, drained by the East fork, or Driftwood fork, of the White river, entering it in the n.e., and forming part of its s.w. boundary; about 340 sq.m.; pop. '80, 13,475—13,240 of American birth, 16 colored. Its surface is hilly, with a large portion of tillable land

still covered with forests. Its soil is fertile, and adapted to the raising of live stock, and the production of fruit, buckwheat, oats, corn, rye, wheat, tobacco, wool, the products of the dairy, honey, sorghum, maple-sugar, and flax. Its mineral products are sandstone and coal; and there are sulphur springs in the n. portion. Among its manufactories are flour-mills, and lumber-mills, spoke factories, blast-furnaces, and distilleries. Seat of justice, Shoals.

MARTIN, a co. in e. Kentucky, formed out of portions of Lawrence and Pike counties, has the Tug fork of the Big Sandy river for its e. boundary, separating it from West Virginia; about 220 sq.m.; pop. '80, 3,057—3,053 of American birth, 32 colored. A range of mountains forms its s.w. border, and its general surface is hilly, with a thick growth of hardwood timber on the hill-sides. Its soil, near the river and its tributaries, is fertile, and corn and live-stock are raised. Coal is found and is easily mined, and salt is manufactured. Seat of justice, Warfield.

MARTIN, an e. co. of North Carolina, touching on Albemarle sound, and having the Roanoke river for its n. boundary; 520 sq.m.; pop. '80, 13,140; traversed by the Seaboard and Raleigh railroad. The surface is level and in some portions swampy; the country is heavily wooded. The soil is fertile, producing corn and cotton. Co. seat, Williamston.

MARTIN, a co. in s. Minnesota, having the state line of Iowa for its s. boundary, drained by the Chanyuska river emptying into the Blue Earth river in the next county, with a few small lakes in the n., and Chalk lake in the s. portion; 720 sq.m.; pop. '80, 5,249—4,245 of American birth. Its surface is somewhat undulating, but spreads out into broad prairies for the most part. Its soil is fertile, and adapted to the raising of sheep, the production of Irish potatoes, dairy products, sorghum, honey, and every variety of grain. Its water-power is utilized by flour and saw mills. Seat of justice, Fairmount.

MARTIN, the name of five popes, of whom the fourth and fifth deserve a brief notice.—MARTIN IV. (Nicholas de la Brie), a Frenchman, was elected in 1281. His name is best known in connection with the memorable tragedy of the "Sicilian Vespers." Having been from the time of his election a devoted adherent of Charles of Anjou, he supported that monarch with all his influence, and even by the spiritual censures which he had at his command, in his effort to maintain French domination in Sicily; and it is to his use of the censures of the church in that cause that many Catholic historians ascribe the decline and ultimate extinction of the authority in temporals which the papacy had exercised under the distinguished pontiffs who preceded him. He died at Perugia in 1285.—MARTIN V. must be noticed as the pontiff in whose election was finally extinguished the great western schism (q.v.). He was originally named Otho Colonna, of the great Roman family of that name. On the deposition of John XXIII., and the two rival popes Gregory XII. and Benedict XIII., in the council of Constance, cardinal Colonna was elected. He presided in all the subsequent sessions of the council, and the fathers having separated without discussing the questions of reform, at that period earnestly called for in the church, Martin undertook to call a new council for the purpose. The council was summoned accordingly, after several years, to meet at Siena, and ultimately assembled at Basel in 1431. Martin died in the same year.

MARTIN (*ante*) I., SAINT, d. 655; son of Fabricius, succeeded Theodore I. in the papal chair, A.D. 640; opposed the will of the emperor Constans II. by assembling the first Lateran council at Rome in October, 649, in which the emperor's decrees were denounced, the pope presiding over 104 bishops from Italy, Sicily, Sardinia, and Africa. Five sessions were held, and the judgment of the council was pronounced in 20 canons, anathematizing all those who do not admit the existence in Jesus Christ of two wills and two operations; this being the question as to which the emperor Constans had pronounced for the opposite side. The opposition to his will on the part of Martin enraged the emperor, who ordered the imprisonment of the pope. He was accordingly taken to the island of Naxos in June, 653, and retained there an exile until Sept. 17 of the following year. He was now taken to Constantinople, where he was detained in prison six months. As he still refused to recant his opinions, he was exiled to the Thracian Chersonese, where he suffered great indignities and deprivation until his death. His body was afterwards removed to Rome, and the church of Rome commemorated his name. Eighteen encyclical letters are attributed to him, and are published in Labbe's *Concilia* and the *Bibliotheca Patrum*.—II., or MARINUS I., d. 884; a native of Montefiascone, in the papal states. He was three times papal legate to Constantinople; elected pope Dec. 23, 882, surviving his election only 14 months.—III., or MARINUS II., born in Rome, succeeded Stephen VIII. in 942, and held the papacy 4 years, until his death, which occurred in 946. He was a patron of learning, and was held in high repute as one whose example was Christian and noble.

MARTIN, Bishop of Tours, and a saint of the Roman Catholic church, was b. in Pannonia about the year 316. He was educated at Pavia, and at the desire of his father, who was a military tribune, entered the army, first under Constantine, and afterwards under Julian the apostate. The virtues of his life as a soldier are the theme of more than one interesting legend. On obtaining his discharge from military service, Martin

became a disciple of Hilary, bishop of Poictiers (q.v.). He returned to his native Pannonia, and converted his mother to Christianity, but he himself endured much persecution from the Arian party, who were at that time dominant; and in consequence of the firmness of his profession of orthodoxy, he is the first who, without suffering death for the truth, has been honored in the Latin church as a confessor of the faith. On his return to Gaul, about 360, he founded a convent of monks near Poictiers, where he himself led a life of great austerity and seclusion; but in 371 he was drawn by force from his retreat, and ordained bishop of Tours. The fame of his sanctity, and his repute as a worker of miracles, attracted crowds of visitants from all parts of Gaul; and in order to avoid the distraction of their importunity, he established a monastery near Tours, in which he himself resided. His life by his contemporary, Sulpicius Severus, is a very curious specimen of the Christian literature of the age, and in the profusion of miraculous legends with which it abounds, might take its place among the lives of the mediæval or modern Roman church. The only extant literary relic of Martin is a short *Confession of Faith on the Holy Trinity*, which is published by Galland, vol. vii. 559. In the Roman Catholic church, the festival of his birth is celebrated on Nov. 11. In Scotland this day still marks the winter-term, which is called *Martinmas* (the mass of St. Martin). Formerly people used to begin St. Martin's day with feasting and drinking, hence the French expressions *martiner* and *faire la St. Martin*, "to feast."

MARTIN, ALEXANDER, LL.D., 1740–1807; b. N. J., of Irish parentage; graduated at the college of New Jersey in 1756; removed in 1772 to Guilford co., N. C.; became a member of the colonial assembly; was appointed in 1776 col. of a regiment, and fought at Brandywine and Germantown; was state senator for several terms between 1779 and 1785; speaker of the senate in 1787–88, and acting governor in 1781–82; was elected governor in 1782; re-elected in 1789; was a member of the U. S. constitutional convention; U. S. senator, 1793–99.

MARTIN, BENJAMIN NICHOLAS, D.D., b. at Mount Holly, N. J., Oct. 20, 1816; graduated at Yale college in 1837, and at the divinity school in 1840; settled as pastor of a Congregational church in Hadley, Mass., 1843–47, and as pastor of the Fourth Presbyterian church in Albany in 1848–49. In 1852 he became professor of rhetoric and intellectual philosophy in the university of the city of New York, which place he still retains.

MARTIN, BON LOUIS HENRI, b. at St. Quentin, Feb. 20, 1810; son of a magistrate of that city. At the age of 20 he was recognized as a youth of unusual elevation of mind and independence of spirit, tempered with a mild and modest manner. Educated for the practice of law he found time for his tendency to literary expression in other channels and on many diverse subjects. In partnership with another youth he published a novel entitled *Tour du Loup* in 2 volumes, and contributed quite a number of little poems to the journals. These were followed by many other romances. While working with Paul Lacroix, it was suggested that they should compile a history of France, to be made up of extracts from different authors. One volume was published, when Lacroix abandoned it, but Martin resolved to go on. It became an enormous labor. The first volume of Martin's work appeared in 1837, and 18 volumes followed down to 1854. In 1844 the academy of inscription gave him a prize of 9,000 francs; in 1851 he received the first prize. In 1860 the work as far as completed was published in a new form in 16 octavo volumes. With the history of France by Thierry, it occupies the highest place. Martin is a distinguished member of the republican party in France. In 1848 he was appointed by Carnot provisional minister of public instruction, but the reactionary methods of the government induced him to resign. On the fall of Napoleon he was made mayor of one of the arrondissements of Paris, and endeavored, without success, to dissuade the communists from their assumption of the government. He was elected from two districts to the national assembly, which he entered early in 1871, and took his seat with the extreme left. In July, 1871, he was elected a member of the academy of moral and political science, and in October councilor-general of his native department *de l'Aisne*. Besides the history of France the following are among his works: *Minuit et Midi*, 1832, reprinted in 1855 under the title of *Tancrède de Rohan; L'Abbaye-au-Bois, ou la Femme de Chambre; Histoire de Soissons*, 1837; *De la France, de son génie et de ses destinées*, 1847; *Daniel Manin*, 1855; *L'Unité Italién et la France*, 1861; *Jean Reynaud*, 1863; *Pologne et Moscovie*, 1863; *Vercingetorix*, 1865; *La Russie d'Europe*, 1866; *Histoire de France populaire*, 1867; *Etudes d'archéologie Celtique*.

MARTIN, DAVID, 1639–1721; a French Protestant clergyman, exiled to Holland by the edict of Nantes, where he became professor of philosophy and theology in Utrecht. He was author of the *History of the Old and the New Testament* printed in French and Dutch at Amsterdam in 1700. It was copiously embellished with fine engravings, and is known as *Mortier's Bible*.

MARTIN, FELIX, b. at Auray, France, in 1804. In 1842 he was sent as a French Jesuit priest to Canada to revive the missions there; founded St. Mary's college in Montreal; collected material for the history of Canada, and has published and edited many works throwing light on the old Canadian Jesuit missions; among which are the following: *Manuel du Pèlerin de Notre Dame de bon Secour*, Montreal, 1848; *Relation des Jesuits*,

an enlarged edition of O'Callaghan's work; *Mission du Canada, rélations inedites*, Paris, 1861; *De Montcalm en Canada*, 1867. He assisted Carayon in a series of volumes on the Jesuit missions.

MARTIN, FRANCIS XAVIER, LL.D., 1764–1846; b. France; settled in Martinique, where he engaged in business, but failed. In 1786 he removed to North Carolina, and gave French lessons. He then learned the printer's trade, edited a newspaper, and published a number of works, among them a series of treatises on the duties of public officers, the fruit of his studies for the bar, to which he had already been admitted. He compiled the colonial statutes of North Carolina, and made digests of the state statutes. To him, also, are due the first published volumes of North Carolina state law reports. He served as a judge of the territory of Mississippi for a year, when he was appointed to a similar position in the territory of Orleans. He had already translated, while in North Carolina, the work of Pothier on *Obligations*, and his familiarity with the civil law enabled him to be of great service to the jurisprudence of the new state of Louisiana, whose first attorney-general he was. Two years later, in 1815, he was appointed a justice of the Louisiana state court, and remained in that office till his death. An almost total blindness, from which he suffered during the last ten years of his life, did not interfere with the discharge of his judicial duties. He reported the decisions of the Orleans superior court from 1819 to 1830, and of the Louisiana supreme court from 1813 to 1830. He published a history of North Carolina in 1829 and of Louisiana in 1827. Harvard and Nashville universities conferred upon him the degree of LL.D.

MARTIN, Sir JAMES RANALD, 1800–74; b. at Kilmuir, Skye; entered the medical staff of the Bengal army in 1818. He was appointed sanitary commissioner in England in 1841, knighted in 1860, and made examining physician of the secretary of state for India, inspector-general of hospitals, etc. His work *On the Influence of Tropical Climates*, published in 1855, is regarded as an authority.

MARTIN, JOHN, an English painter, was b. in the neighborhood of Hexham, Northumberland, July 19, 1789, went to London in 1806, and made his first appearance as an exhibitor at the royal academy in 1812. His picture was entitled "Sadak in Search of the Waters of Oblivion," and attracted much notice. It was followed within two years by the "Expulsion from Paradise," "Clytée," and "Joshua commanding the Sun to stand Still." This last, though popularly successful, was the cause of a quarrel with the academy, which cut him off from any of its honors. Till near the close of his life, he painted pictures in a style which was considered "sublime," by the sort of people who thought Montgomery's *Satan* and Pollok's *Course of Time* equal to *Paradise Lost*. The principal of these "sublime" productions are "Belshazzar's Feast" (1821); "Creation" (1824); "The Deluge" (1826); "The Fall of Nineveh" (1828); "Pandemonium" (1841); "Morning" and "Evening" (1844); "The Last Man" (1850). Martin died Feb. 9, 1854.

MARTIN, JOSIAH, 1737–86; b. Va.; entered the British army as ensign in 1756, and was afterwards promoted to the rank of lieut.col. In 1771 he was appointed governor of North Carolina, and at the breaking out of the revolutionary war took refuge on board a British man-of-war; was with the British fleet before Charleston in 1776, and with Cornwallis at the battle of Camden in 1780. After this he withdrew to Long Island, and thence to England, and died in London.

MARTIN, LUTHER, LL.D., 1744–1826; b. New Brunswick, N. J.; graduated at Princeton in 1766; was a prominent lawyer in Virginia and Maryland; a member of congress in 1784–85; attorney-general of Maryland in 1788 and 1818. As a member of the convention which framed the constitution of the United States, he earnestly opposed the adoption of that instrument. In 1814 he was appointed judge of oyer and terminer in Baltimore. He was a zealous friend of Aaron Burr, defending him on his trial for treason. Died in New York.

MARTIN, ROBERT MONTGOMERY, b. England about 1805; distinguished as a geographer and statistician; author of *The Colonies of the British Empire; The British Colonial Library; The History, Antiquities, Topography, and Statistics of Eastern India; Ireland Before and After the Union; China, Political, Commercial, and Social; The Hudson's Bay Territories; The Indian Empire;* and *Progress and Present State of British India* (1862). He was for several years editor of the *Colonial Magazine;* he also superintended the publication of *The Illustrated Atlas and Modern History of the World.*

MARTIN, THEODORE, was b. in Edinburgh in 1816, was educated at the high school, and studied law at the university of that city. In 1846 he became a parliamentary solicitor in London. His first literary undertaking was editing Sir Thomas Urquhart's translation of Rabelais's *Gargantua and Pantagruel* (1838). In 1845 appeared the *Bon Gaultier Ballads*, the joint production of Martin and prof. Aytoun; his translation of *Poems and Ballads of Goethe* (1858); *Danish Dramas* (1857); *Odes of Horace* (1860); *Poems*, original and translated (1862); Dante's *Vita Nuova* (1862); *Faust* (1865); *Life of Professor Aytoun* (1867); *Life of H. R. H. the Prince Consort*, vols. i. ii. iii. (1874–77). Martin in 1851 married Miss Helen Faucit, the well-known actress; in 1875 was made a companion of the bath, and an LL.D. of Edinburgh university.

MARTI'NA, a fine t. of the Italian province of Lecce, situated on a hill 18 m. n.n.e. of Taranto. Pop. '72, 18,102. It has a fine palace in the style of the great Roman palace Panfili.

MARTIN, AIMÉ. See AIMÉ-MARTIN.

MARTINEAU, HARRIET, an English authoress, was b. at Norwich, June 12, 1802. Her education was conducted for the most part at home; from an early age she was a lover of books, and was wont to amuse her solitary hours by committing her thoughts to paper. The deafness which she suffered from her youth no doubt strengthened her habits of study, and had much to do with the working out of her career. She appeared in print (in a religious periodical, the *Monthly Repository*) before she was out of her teens, and when, in 1829, she and her sisters lost their small fortunes by the failure of the house in which their money was placed, she continued to write as she had written before, though now under the new necessity of earning a livelihood. The subjects upon which her pen was exercised are of the most varied kind, including some—such as politics—which have rarely been before attempted by women. Her first volume, entitled *Devotions for Young People*, appeared in 1823; and was followed in 1824 by *Christmas Day*, a tale, and by *The Friend*, a sequel, the year after. In 1826 she published *Principle and Practice*, and *The Rioters;* and for two years thereafter she was busily engaged writing stories and a series of tracts on social matters, adapted mainly for the perusal of the working-classes. In 1830 she produced her *Traditions of Palestine*. During the same year, the association of Unitarian Dissenters awarded her prizes for essays on the following subjects: *The Faith as Unfolded by many Prophets, Providence as Manifested Through Israel*, and *The Essential Faith of the Universal Church*. Her next important literary venture was unique, and in one of the softer sex almost audacious, *The Illustrations of Political Economy*, a series of tales, which met with great and deserved success, and was followed by others illustrative of *Taxation*, and *Poor-Law and Paupers*. In 1834 she crossed the Atlantic, and published her *Society in America* in 1837. In 1839 she published *Deerbrook*, and in 1840, *The Hour and the Man*. She afterwards produced a series of tales for the young, the best known of which are *Feats on the Fiord*, and *The Crofton Boys*. During the period 1839–44, when she was more or less an invalid, she wrote *Life in the Sick-room*. Her recovery she attributed to mesmerism, an avowal which was the cause of a fierce discussion in the scientific world, and exposed herself to much insult and ridicule. On her recovery she published *Forest and Game-Law Tales*. In 1846 she visited Palestine, and collected materials for *Eastern Life, Present and Past*, which she published on her return. Afterwards she completed Mr. Knight's *History of England During the Thirty Years' Peace*. In 1851, in conjunction with Mr. H. G. Atkinson, she published a series of *Letters on the Laws of Man's Social Nature and Development*, and in 1869, *Biographical Sketches* (collected from the *Daily News*). The long catalogue of her literary labors (she wrote more than 100 books) includes her translation of Comte's *Positive Philosophy; Household Education; Health, Husbandry, and Handicraft;* etc. Martineau was a constant contributor to the larger reviews, and the daily and weekly press. She died June 27, 1876; and her *Autobiography*, written and printed many years before, was published with an additional editorial volume in 1877.

MARTINEAU, JAMES, brother of the preceding, was b. at Norwich, April 21, 1805. He was educated for the ministry in connection with the Unitarian body of Christians, and was pastor of congregations in Dublin and Liverpool. He was for many years a professor in Manchester new college, and removed to London when that institution was transferred thither in 1858, becoming one of the pastors of the chapel in Little Portland street. He became principal of the college in 1868, and retired from the pastorate of the chapel in 1874. He was one of the founders of the *National Review*, and has been a frequent contributor to its pages. This periodical may be taken as generally representing his theological views. Martineau is one of the most earnest and lofty of living religious writers. He is deeply read in German theology and philosophy, and is remarkable for strong grasp of thought and power of subtle analysis. He is a master of English style, and in elucidating the most abstract thought he has seldom been surpassed. His principal works are the *Rationale of Religious Inquiry* (1836); *Endeavors After the Christian Life* (1843); *Miscellanies* (1852); *Studies of Christianity* (1858); *Essays, Philosophical and Theological* (1869); and *Hours of Thought on Scripture Things* (1877).

MARTINEAU, JAMES (*ante*), is of French lineage. His father was in humble circumstances—a manufacturer of bombazines. From the beginning of his ministry his sermons attracted attention by their deep earnestness and strong grasp upon the gravest problems of human life. While he was preaching in Liverpool in 1839, he took part with J. H. Thom and Henry Giles in a controversy with thirteen clergymen of the church of England upon themes involving the points of difference between Unitarians and evangelical Christians. The lectures on both sides were published in 2 vols., entitled *Unitarianism Confuted*, and *Unitarianism Defended*. The themes discussed by Mr. Martineau in these volumes were: "The Bible;" "The Deity of Christ;" "Vicarious Redemption;" "The Christian View of Moral Evil;" and "Christianity without Priest and without Ritual." He ranks by universal consent among the profoundest thinkers and metaphysicians of the age, and probably is not surpassed by any living writer for the charming simplicity and forceful clearness of his style. He has done much for his sect, but far more for

Christianity itself by his efforts to reconcile the claims of faith and reason in religion. He has distinguished himself, especially in the last few years, as the champion of spiritual faith against the various schools of atheism and materialism, winning thus the admiration and gratitude of Christians of every name. His *Religion and Modern Materialism* was published in New York in 1874. Since that time he has written quite extensively for current reviews and magazines, though ill-health compelled him several years ago to retire from the pulpit.

MARTINDALE, JOHN H., b. Sandy Hill, N. Y., 1815; graduated at West Point, and served for a time in the army, but resigned in 1836 to become a railroad engineer. In 1838 he settled in Batavia, N. Y., practicing law there until 1851, when he removed to Rochester. He enlisted in the war for the union in 1861, was appointed a brig.gen. of volunteers, and led a brigade in Porter's corps in the peninsular campaign of 1862. He was military governor of the District of Columbia from Nov., 1862, until May, 1864, when he joined the 18th corps of the army of the James, and was in the battles of Cold Harbor and the siege of Petersburg. He resigned on account of ill-health, Sept. 13, 1864, and was elected attorney-general of the state of New York in 1866.

MARTIN DE MOUSSY, JEAN ANTOINE VICTOR, 1810–70; b. at Moussy-la-Vieux, France; studied medicine in Paris, and practiced in the military hospitals. In 1841 he went to Montevideo, S. A., where he was engaged in the practice of medicine for 12 years, keeping all that time a meteorological register. During the siege of Montevideo, which continued 9 years, he was director of the medical service to the French and Italian legions. After the downfall of Rosas, the Argentine dictator, in 1852, Dr. Martin de Moussy was employed by the government of president Urquiza to prepare a geographical description of the republic. In the execution of this task he spent 4 years in constant travel, visiting Paraguay, the Gran Chaco, portions of Chili and Bolivia, and all the Argentine provinces in succession. The results of his labors are embodied in his work in 3 vols., entitled, *Description, géographique et statistique, de la Confédération Argentine.* This work, with the atlas accompanying it, is of the highest authority. Dr. Martin de Moussy was also one of the writers of the *Encyclopédie des Connaissances utiles*, and of the *Dictionnaire Politique.* Died in Paris.

MARTINET, ACHILLE LOUIS, b. Paris, 1806; studied engraving at Rome, where he won the second grand prize in 1826, and the first in 1830. He has engraved from the works of the great Italian painters, and the most celebrated living artists as well. His earliest notable success was an engraving, exhibited in 1835, of Rembrandt's portrait of himself; and among his later works may be mentioned engravings of Murillo's "Nativity," 1869; and Heim's "Martyrdom of St. Juliette," 1873.

MARTINEZ DE LA ROSA, FRANCISCO, 1789–1862; b. Spain; studied law at the university of Granada, and was appointed lecturer on ethics at the university of S. Miguel when less than 20 years old. The French had just invaded Spain, and he entered enthusiastically into the national movement. He was employed by the junta of Granada, his native town, to get arms and supplies for the Spanish cause from the English at Gibraltar, and he afterwards went to England on the same errand. There, in 1811, his first poem, *Zaragoza*, was published. He wrote also, while in London, a sketch of the Spanish war of independence for Blanco White's paper, *El Español*, then being published. On his return to Spain he produced, at Cadiz, a tragedy called *La Viuda de Padilla*, which was successful, and was followed by a comedy *Lo que puede un Empleo*, satirizing political life. In 1813 he was returned to the cortes from Granada, and at once took a high position as an orator. He was a supporter of the constitution of 1812, which king Ferdinand, on his return to Spain in 1814, overthrew, when Martinez was sentenced to imprisonment for 10 years. Released by an insurrection in 1820, he was for a short time secretary of state, but his opinions had somewhat moderated during his absence, and he lost favor with the populace, to avoid whose violence he resigned. The next eleven years of his life were passed in Paris, with an occasional trip to Italy and Germany. Between 1827 and 1837 he published at Paris a collection of his *Obras Literarias* in 5 vols. These contain, besides the *Viuda de Padilla*, 4 other plays: *La Niña en Casa y la Madre en la Mascara; Edipo*, a classical tragedy; *Aben Humeya*, founded on the Moorish insurrection under Philip II.; and *La Conjuracion de Venecia*, written in the manner of the French romanticists. In the collection are also included a *Poetica*, or treatise on the art of poetry, and a number of essays on Spanish literature. In 1830 he was permitted to return to Spain, and began to write a historical novel, *Doña Isabel de Solis*, the last volume of which was not published till 1846. Meanwhile he became the head of a liberal ministry, and was the author of the royal statute of 1834, which created a constitutional government like the English, and took away the ancient privileges of the provinces. The abolition of these privileges caused a revolt by the Basque provinces, which attached themselves to Don Carlos; civil war broke out, Martinez de la Rosa and the moderates became more and more unpopular, an attempt was made upon his life in 1835, and the next year he resigned. He distinguished himself in opposition in the cortes, and he once more took office; but the constitution of 1812 was restored, the royal statute annulled, and on the fall of queen Christina in 1840 he again went to Paris, and resumed the composition of *Espíritu del Siglo*, a work on political science, which had been begun in 1835, and whose tenth and last volume was pub-

lished in 1851. Upon the fall of Espartero he entered the Narvaez cabinet, and was afterwards ambassador to Paris and to Rome. Returning to Spain he was elected president of the chamber of the peers; and he was perpetual secretary of the Spanish academy.

MARTINIQUE or MARTINICO, called by the natives MADIANA, one of the Lesser Antilles, is 40 m. long, about 12 m. broad, and has an area of about 380 sq.m., and '75, 160,831 inhabitants, of whom about 90,000 are black. The island was discovered by the Spaniards in 1493, colonized by the French in 1635, and now belongs to that nation. It is of an oval form, with much indented coasts, and is everywhere mountainous; the highest peak, mount Pelée being considerably more than 4,000 ft. above sea-level. There are six extinct volcanoes on the island, one of them with an enormous crater. The cultivated portion of Martinique (about one-third of the whole) lies chiefly along the coast. The climate is moist, but, except during the rainy season, is not unhealthy, and the soil is very productive. Of the land in cultivation, about three-fifths are occupied with sugar cane. Slavery was abolished in 1848. The island is liable to dreadful hurricanes. A floating dock was opened in 1867, at Fort-la-France, the capital (formerly Fort Royal); a telegraph line thence to St. Pierre (q.v.) was at work in 1866; and since then a railway has been set on foot. The exports exceed a million sterling in annual value.

MARTIN MAR-PRELATE, CONTROVERSY OF. Certain tracts; appeared in England about 1580, described by Hardwick in his church history "as a series of scurrilous libels in which the queen, bishops, and the rest of the conforming clergy were assailed with every kind of contumely." They are supposed to have been written by some Puritan radicals in the height of the controversy between the church and the Puritans. One writer thinks "there is reason to believe that the whole was a contrivance of the Jesuits;" but of this there is no evidence. Two Puritan divines, Udal and Penry, were tried, and charged with the authorship, but they refused to make any disclosures, and the real authorship of the lampoons was never known. Neale, in his history of the Puritans, gives their titles and contents.

MARTINMAS, in Scotland, is one of the four quarter-days for paying rent—viz., Nov. 11.

MARTINSBURG, a t. in n.e. West Virginia, in the neighborhood of the Blue Ridge, a region of great fertility; pop. '80, 6,384. It is at the junction of the Martinsburg and Potomac division of the Cumberland Valley railroad and the Baltimore and Ohio, and is the center of an important and increasing trade. It is 78 m. e. of Cumberland, and 100 m. w. of Baltimore. It is lighted with gas, and has water-works erected at a cost of $90,000, a large court-house, 3 newspapers, 11 churches, 3 banks (one national), with a capital, collectively, of $200,000. It has a fine market, a variety of stores, and a number of railroad repair shops, employing 600 hands. Its industries are the manufacture of furniture and carriages; it has also distilleries, planing and flour mills. There are 6 excellent public schools, and 2 seminaries for girls.

MARTIUS, CARL FRIEDRICH PHILIPP VON, one of the most distinguished of modern travelers and naturalists, b. at Erlangen, 1794. He studied medicine at Erlangen, and had published two botanical works, when he was induced to proceed to Brazil as a member of a scientific expedition sent out by the Austrian and Bavarian governments, and by his researches in that country acquired a reputation inferior perhaps to that of no scientific traveler except Humboldt. He was specially intrusted with the botanical department, but his researches extended to ethnography, statistics, geography, and natural science in general; and his works, published after his return, exhibit a poet's love of nature and great powers of description. These works are: *Reise nach Brasilien* (3 vols. Munich, 1824–31); *Nova Genera et Species Plantarum* (3 vols. Munich, 1824–32); and *Icones Plantarum Cryptogamicarum* (Munich, 1828–34). He also published a most valuable monograph of palms, *Genera et Species Palmarum* (3 vols. Munich, 1823–45). He is the author of a number of other botanical works, some of which are monographs of orders and genera; also of works relative to tropical America, as *Die Pflanzen und Thiere des tropischen Amerika* (Munich, 1831); *Das Naturell, die Krankheiten, das Arzthum und die Heilmittel der Urbewohner Brasiliens* (Munich, 1843); *Systema Materiæ Medicæ Vegetabilis Brasiliensis* (Leip. 1843). He also contributed largely to the *Flora Brasiliensis;* and wrote *Beiträge zur Ethnographie u. Sprachenkunde Amerikas zumals Brazilien* (1867), etc. He was professor of botany and director of the botanic garden at Munich. He died in 1868.

MARTLET, in heraldry, a bird resembling a swallow, with long wings, very short beak and thighs, and no visible legs, given as a mark of cadency to the fourth son. It is also otherwise used as a charge. The martlet was originally meant for the martin, and in the earliest heraldry, it is not deprived of its feet.

MARTOS, a t. of Andalusia, Spain, 16 m. s.w. of the city of Jaen, on a steep hill crowned by an old castle. It is resorted to for its mineral waters. Pop. stated at 11,000.

MARTYN, HENRY, 1781–1812; b. Truro, co. of Cornwall, England; of humble origin, his father being a laborer in the mines of Gwenap. At the age of seven he was placed at the grammar school of Truro with Dr. Carden, where he made great proficiency in the classics. Remaining here till the age of fourteen, he offered himself as a candidate

for a vacant scholarship at Corpus Christi college, Oxford, but, being unsuccessful, he returned to Dr. Carden's school, and after two years' study entered, in 1797, St. John's college, Cambridge; obtained in 1801 the highest academical honor of "senior wrangler" and the prize for the greatest proficiency in mathematics; in 1802 was chosen fellow of his college, besides gaining the first prize for the best Latin prose composition. The sudden death of his father and the earnest preaching with the faithful counsel of Mr. Simeon, the university preacher, led to his conversion and dedication to the ministry. A remark of Mr. Simeon on the good resulting from the services of Dr. Carey in India, and a perusal of the *Life of David Brainerd*, led to his deciding to be a missionary. Bright prospects of honorable distinction at Cambridge, intense enthusiasm in literary pursuits, an exquisite relish for the refined enjoyments of social life, affected not his purpose. After receiving ordination in 1803, he was curate of the rev. C. Simeon; in 1804 he was public examiner in St. John's in the classics and Locke's treatise on the understanding; in 1805 he sailed for India as chaplain in the East India company's service, and reached Calcutta in May, 1806; in September received his appointment to Dinapore, and soon conducted worship among the natives in their own vernacular, and established schools for their instruction. He engaged while here in the study of Sanskrit, in revising the sheets of his Hindustani version of the New Testament, and superintending the Persian translation made by Sabat. He had religious discussions daily with his moonshee and pundit. In 1807 he completed the translation of the Book of Common Prayer into Hindustani. In March of the same year he finished a *Commentary on the Parables*. In 1809 his ministry among the heathen began and he was stationed at Cawnpore. He suffered exceedingly in the journey from Dinapore from the intense heat. And soon after his arrival he preached to a thousand soldiers in a hollow square, in the open air, with the heat so great that even before sunrise many dropped down from its effect. He continued his work among the hundreds of heathen mendicants who crowded around him. Having perfected himself in the Persian language, he decided to extend his labors to that country, and took up his residence at Shiraz, where he revised, with the aid of learned natives, his Persian and Arabic translation of the New Testament, and held discussions with the mollahs and sufis, many of whom were greatly impressed. "Henry Martyn," said a Persian mollah, "was never beaten in argument; he was a good man, a man of God." In view of the effect of his frequent discussions, and of his being engaged in a translation of the New Testament into Persian, the preceptor of all the mollahs wrote an Arabic defense of Mohammedanism. To this Martyn replied in Persian. At Shiraz he held a public discussion with a professor of Mohammedan law, and another more important with Mirza Ibraheem in a court of the palace of one of the Persian princes, where was collected a large body of mollahs. Having finished his translation of the New Testament, he commenced a version of the Psalms from the Hebrew. Having ordered two copies of the New Testament to be prepared, one for the king of Persia, the other for the prince Abbas Mirza, his son, he left Shiraz for Talaiz to make the presentation, but was seized with fever on the way and so prostrated that he found it necessary to seek a change of climate. Compelled thus so relinquish his purpose, sir Gore Ouseley, the British ambassador, promised to present the New Testiment at court, which he did, and the king publicly expressed his approbation of the work. The ambassador also carried the MS. to St. Petersburg, where, under his superintendence, it was printed and put into circulation. Martyn now decided to return to England, and Sept., 1812, set out for Constantinople, reaching Tocat in Asia Minor, where his utter prostration compelled him to stop. Either falling a victim to the plague then raging or sinking under the disease which had so greatly reduced him, he died Oct. 16, 1812, in the 32d year of his age. A monument was erected at Tocat in 1856. He was the author of *Sermons, Controversial Tracts, Journals and Letters.*

MARTYNIA, a genus of plants belonging to the order *bignoniaceæ* (q.v.). They are low, branching annuals with thick stems; leaves simple, rounded; flowers in racemes, large, bell-shaped, and somewhat 2-lipped; fertile stamens, 4, sometimes only 2. The fruit is a pod with a long incurved beak; when ripe the pod splits into 2-hooked horns, opening at the apex, between the horns. Seeds numerous, black, with a thick, wrinkled coat. The plant has a rather unpleasant odor. There are seven or eight species, which are natives of warm countries, except *M. proboscidea*, which is a native of the United States, growing on the banks of the Mississippi, in southern Illinois, and south-westward. It is called the unicorn plant, and is cultivated in gardens for its fruit, which, when the pods are young, are used for making pickles. The leaves of this species are heart-shaped, oblique, entire, the upper alternate; corolla dull white or purplish, or spotted with yellow and purple: endocarp of the fruit crested on one side, long beaked. *M. fragrans*, from New Mexico, has violet purple flowers, having a rather pleasant odor, somewhat like that of vanilla.

MARTYR (Gr. *martyr*, a witness), the name given in ecclesiastical history to those who, by their fearless profession of Christian truth, and especially by their fortitude in submitting to death itself rather than abandon their faith, bore the "witness" of their blood to its superhuman origin. Of the same use of the word, there are some examples also in the New Testament, as in Acts xxii. 20, Apoc. ii. 13, and xvii. 6. But this meaning, as its technical and established signification, is derived mainly from ecclesi-

astical writers. During the persecutions (q.v.) of the Christians in the first three centuries, contemporary writers, as well pagan as Christian, record that many Christians, preferring death to apostasy, became martyrs or witnesses in blood to the faith, often in circumstances of the utmost heroism. The courage and constancy of the sufferers won the highest admiration from the brethren. It was held a special privilege to receive the martyr's benediction, to kiss his chains, to visit him in prison, or to converse with him; and, as it was held that their great and superabundant merit might, in the eyes of the church, compensate for the laxity and weakness of less perfect brethren, a practice arose by which the martyrs gave to those sinners who were undergoing a course of public penance, letters of commendation to their bishop, in order that their course of penance might be shortened or suspended altogether. See INDULGENCE. The day of martyrdom, moreover, as being held to be the day of the martyrs' entering into eternal life, was called the "natal" or "birth" day, and as such was celebrated with peculiar honor, and with special religious services. Their bodies, clothes, books, and the other objects which they had possessed were honored as relics (q.v.), and their tombs were visited for the purpose of asking their intercession. See INVOCATION. The number of martyrs who suffered death during the first ages of Christianity has been a subject of great controversy. The ecclesiastical writers, with the natural pride of partisanship, have, it can hardly be doubted, leaned to the side of exaggeration. Some of their statements are palpably excessive; and Gibbon, in his well-known 16th chapter, throws great doubt even on the most moderate of the computations of the church historians. But it is clearly though briefly shown by Guizot in his notes on this celebrated chapter (see Milman's *Gibbon's Decline and Fall*, i. 598), that Gibbon's criticisms are founded on unfair and partial data, and that even the very authorities on which he relies demonstrate the fallaciousness of his conclusions. Those who are interested in the subject will find it discussed with much learning and considerable moderation in Ruinart's *Acta Primitiva et Sincera Martyrum*. Considerable difference of opinion also has existed as to what, in the exploration of the ancient Christian tombs in the Roman catacombs, are to be considered as signs of martyrdom. The chief signs, in the opinion of older critics, were (1), the letters B. M.; (2), the figure of a palm-tree; and (3), a vial with the remains of a red liquor believed to be blood. Each of these has in turn been the subject of dispute, but the last is commonly regarded as the conclusive sign of martyrdom. The first recorded martyr of Christianity, called the "proto-martyr," was the deacon Stephen, whose death is recorded Acts vi. and vii. The proto-martyr of Britain was Alban, of Verulam, who suffered under Diocletian in 286 or 303.

MARTYR, PETER, Italian historian. See ANGHIERA.

MARTYR, PETER, Protestant reformer. See VERMIGLI, PIETRO MARTIRE.

MARTYROL'OGY, a calendar of martyrs and other saints, arranged in the order of months and days, and intended partly to be read in the public services of the church, partly for the guidance of the devotion of the faithful toward the saints and martyrs. The use of the martyrology is common both to the Latin and to the Greek church, in the latter of which it is called *Menologion* (from *mēn*, a month), or "month-calendar." The earliest extant Greek martyrology, or menology, dates from the 9th century. It was published in 1727 by cardinal Urbini. The oldest Latin martyrology is that attributed to St. Jerome, published in the 11th volume of the collected edition of his works by Vallars; but the genuineness at least of some portions of it is more than doubtful. In the mediæval period, martyrologies were issued in England by Venerable Bede; in France by Florus, Ado, and Usuard; and in Germany by St. Gall, Nolter, and Rabanus Maurus. The so called "Roman Martyrology" is designed for the entire church, and was published by authority of Gregory XIII., with a critical commentary by the celebrated cardinal Baronius in 1586. A still more critical edition was issued by the learned Jesuit, Herebert Rosweide.

MARUT is, in Hindu mythology, the god of wind; his wife is Anjanâ, and his son Hanumân (q.v.). Bhîma, the second of the Pându princes (see MAHÂBHÂRATA), is likewise considered as an offspring of this god.

MARVELL, ANDREW, an English writer and politician, was b. Nov. 15, 1620, at Hull, in Yorkshire, where his father was master of the grammar-school and lecturer of Trinity church. He studied at Trinity college, Cambridge, and afterwards spent several years in various parts of the continent, "to very good purpose," according to Milton. He returned to England about 1653, and was employed by Oliver Cromwell as tutor to a Mr. Dutton; in 1657 he became assistant-secretary to Milton; and in 1660 was chosen by his native town to represent it in parliament. Marvell's parliamentary career was both singular and honorable. Without fortune or influence, possessing no commanding talent as a speaker, nor, indeed, brilliant intellectual qualities of any kind, he maintained a character for integrity so genuine and high that his constituency felt itself honored by his conduct, and allowed him to the end of his life "a handsome pension." Otherwise, it would have occasionally fared ill with this incorruptible patriot, for he was often reduced to great pecuniary straits. Charles II. made many but fruitless efforts to win him over to the court-party. The story of the interview between Marvell and the lord treasurer Danby, who had found out the patriot's lodgings (with difficulty) "up two

pair of stairs in one of the little courts in the Strand," is believed to be essentially true, and indicates a certain noble republican simplicity of nature which cannot be too highly admired. Marvell died Aug. 16, 1678, not without suspicion of poison. His writings, partly in verse and partly in prose, are satirical, sharp, honest and pithy (like his talk), but they relate to matters of temporary interest, and are now well-nigh forgotten. An edition of them was published, along with a life of the author, by capt. Edward Thompson, London, 1776.

MARVEL OF PERU. See JALAP.

MARVIN, ENOCH M., D.D., b. Warren co., Mo., June 12, 1823; in 1841 became a minister of the Methodist Episcopal church and a member of the Missouri conference. He was elected a bishop of the M. E. church, south, at the general conference held in New Orleans in 1866. He enjoys a high reputation as a preacher, and has published a treatise on *The Work of Christ.* His official residence is at St. Louis.

MARWAR. See JOUDPORE, *ante.*

MARX, KARL, b. Prussia, 1818; educated at Bonn and Berlin; in 1842 went to Cologne, where he edited the *Rheinische Zeitung* for a year, when it was suppressed. He now established himself in Paris and undertook, with Arnold Ruge, the publication of an edition of Hegel's *Philosophy of Jurisprudence*, revised, and other literary labors. Having employed the press to attack Prussia, the Prussian government asked his expulsion from France, which was granted, and he settled in Brussels in 1846. He had now become interested in the International, the new socio-political organization, and devoted himself with ardor to the promulgation of advanced views concerning the rights of labor and of the laboring-class. After the revolution of 1848 he again went to Paris, his sentence of banishment being now rendered inoperative; but soon afterwards established in Cologne the *Neue Rheinische Zeitung,* in the interest of social and political liberty. He was by this time a pronounced agitator, constantly embroiled with the authorities on account of the progressive character of his ideas and the boldness of his utterances. In 1849 he committed himself in the instance of the Baden insurrection, and was expelled from Germany, retiring once more to France and thence to London, where he has resided ever since. In 1864 he became a member of the International; and having been chosen to prepare the constitution and other initial documents of the organization, these were adopted at the congress of Geneva in 1866. In framing these important documents, Marx came in competition with Mazzini and Bakunin, both of whom prepared programmes for this occasion. The statement by Marx of the foundation and motive of the International, is precise, definite, and conclusive, without being so radical and revolutionary as the ideas of some of its members, including Marx himself; who, on the occurrence of the atrocities of the commune in Paris, did not hesitate to issue a pamphlet indorsing the action of the communists. The rules of the International, as framed by Marx and adopted by the congress of Geneva, were as follows: "Considering that the emancipation of the working classes must be conquered by the working classes themselves; that the struggle for the emancipation of the working classes means not a struggle for class privileges and monopolies, but for equal rights and duties, and the abolition of all class rule; that the economical subjection of the man of labor to the monopolizer of the means of labor, that is, the sources of life, lies at the bottom of servitude in all its forms, of all social misery, mental degradation and political dependence; that the economical emancipation of the working classes is therefore the great end to which every political movement ought to be subordinate as a means; that all efforts aiming at that great end have hitherto failed, from the want of solidarity between the manifold divisions of labor in each country, and from the absence of a fraternal bond of union between the working classes of different countries; that the emancipation of labor is neither a local nor a national, but a social problem, embracing all countries in which modern society exists, and depending for its solution on the concurrence, practical and theoretical, of the most advanced countries; that the present revival of the working classes in the most industrious countries of Europe, while it raises a new hope, gives solemn warning against a relapse into the old errors, and calls for the immediate combination of the still disconnected movements: for these reasons, the first international workingmen's congress declares that this international association, and all societies and individuals adhering to it, will acknowledge truth, justice, and morality as the basis of their conduct toward each other and toward all men, without regard to color, creed, or nationality. This congress considers it the duty of a man to claim the rights of a man and a citizen, not only for himself, but for every man who does his duty. No rights without duties, no duties without rights. And in this spirit they have drawn up the following rules of the international association: 1. This association is established to afford a central medium of communication and co-operation between workingmen's societies existing in different countries and aiming at the same end, viz.: the protection, advancement, and complete emancipation of the working classes. 2. The name of the society shall be "The International Working Men's Association." 3. The general council shall consist of workingmen belonging to the different countries represented in the international association. It shall from its own members elect the officers necessary for the transaction of business, such as a president, a treasurer, a general secretary, corresponding secretaries for the different countries, etc. The congress appoints annually the seat of the general council, elects a number of mem-

bers, with power to add to their numbers, and appoints time and place for the meeting of the next congress. The delegates assemble at the appointed time and place without any special invitation. The general council may, in case of need, change the place, but has no power to postpone the time of meeting. 4. On its annual meetings, the general congress shall receive a public account of the annual transactions of the general council. In cases of urgency it may convoke the general congress before the regular yearly term. 5. The general council shall form an international agency between the different co-operating associations, so that the working men in one country be constantly informed of the movements of their class in every other country; that an inquiry into the social state of the different countries of Europe be made simultaneously, and under a common direction; that the questions of general interest mooted in one society be ventilated by all; and that when immediate practical steps should be needed, as, for instance, in case of international quarrels, the action of the associated societies be simultaneous and uniform. Whenever it seems opportune, the general council shall take the initiative of proposals to be laid before the different national or local societies. To facilitate the communications, the general council shall publish periodical reports. 6. Since the success of the working men's movement in each country cannot be secured but by the power of union and combination, while, on the other hand, the usefulness of the international general council must greatly depend on the circumstance whether it has to deal with a few national centers of working men's associations, or with a greater number of small and disconnected local societies, the members of the international association shall use their utmost efforts to combine the disconnected working men's societies of their respective countries into national bodies represented by central national organs. It is self-understood, however, that the application of this rule will depend upon the peculiar laws of each country, and that, apart from legal obstacles, no independent local society shall be precluded from directly corresponding with the general council. 7. The various branches and sections shall, at their places of abode and as far as their influence may extend, take the initiative not only in all matters tending to the general progressive improvement of public life, but also in the foundation of productive associations and other institutions useful to the working class. 8. Each member of the international association, on removing his domicile from one country to another, will receive the fraternal support of the associated working men. 9. Everybody who acknowledges and defends the principles of the international working men's association is eligible to become a member. Every branch is responsible for the integrity of the members it admits. 10. Every section or branch has the right to appoint its own corresponding secretary. 11. While united in a perpetual bond of fraternal co-operation, the working men's societies joining the international association will preserve their existent organizations intact. 12. Everything not provided for in the present rules will be supplied by special regulations, subject to the revision of every congress."

MARY, The Blessed Virgin (Heb. *Miriam*, Gr. *Maria* or *Mariam*), called in the New Testament "the mother of Jesus" (Matt. ii. 11, Acts i. 14), as the mother of our Lord according to the flesh, is held in high honor by all Christians; and her intercession is invoked with a higher religious worship and a firmer confidence than that of all the other saints, not only in the Roman church, but in all the Christian churches of the east —the Greek, the Syrian, the Coptic, the Abyssinian, and the Armenian. Of her personal history, but few particulars are recorded in Scripture. Some details are filled up from the works of the early fathers, especially their commentaries or deductions from the scriptural narrative; some from the apocryphal writings of the first centuries, and some from mediæval or modern legendaries. The twofold genealogy of our Lord (Matt. i. 1–16, and Luke iii. 23–38) contains the only statement regarding the family of Mary which the sacred writers have left. The genealogy of our Lord in St. Matthew is traced through Joseph; and as it is plainly assumed that Mary was of the same family with her husband Joseph, the evidence of the descent of the latter from David is equivalently an evidence of the origin of Mary from the same royal house. But the genealogy of Christ as traced in St. Luke is commonly held to be the proper genealogy of his mother in the flesh, Mary. Hence it is inferred that the Heli of this genealogy (Luke iii. 23) was the father of Mary; and it may be added, in confirmation of this inference, that Mary is called in the Talmud the "daughter of Heli," and that Epiphanius (Hor. lxxviii. *n.* 17) says her parents were Anna and "Joachim," a name interchanged in Scripture (as 2 Chron. xxxvi. 4) with Eliachim, of which name Eli or Heli is an abridgment. The incidents in her personal history recorded in Scripture are few in number, and almost entirely refer to her relations with our Lord. They will be found in Matt. i., ii., xii.; Luke i., ii.; John ii., xix.; and Acts i., where the last notice of her is of her "persevering in prayer" with the disciples and the holy women at Jerusalem after our Lord's ascension (Acts i. 14). Beyond the few leading facts which will be found under these references, the Scripture is silent as to the life of Mary during the presence of our Lord on earth; nor of her later life is there any record in the canonical Scriptures. The apocryphal gospels, entitled "The Gospel of the Nativity of Mary," and the "Protevangelion of the Birth of Christ," contain some additional, but, of course, unauthentic particulars as to the lineage, birth, and early years of Mary; among which is the miraculous story of her betrothal with Joseph, immortalized by the pencil of Raphael, according to which narrative Joseph was selected from among all who had been pro-

posed as suitors for the hand of Mary by the supernatural sign of a dove issuing from his rod and alighting upon his head. See Protevangelion, cap. viii. As to her history after the ascension of her son, the traditions differ widely. A letter ascribed to the council of Ephesus speaks of her as having lived with John at that city, where she died and was buried. Another epistle, nearly contemporaneous, tells that she died and was buried at Jerusalem, at the foot of the mount of Olives. Connected with this tradition is the incident which has so often formed a subject of sacred art, of the apostles coming to her tomb on the third day after her interment, and finding the tomb empty, but exhaling an "exceeding sweet fragrance." On this tradition is founded the belief of her having been assumed into heaven, which is celebrated in the festival of the assumption. The date of her death is commonly fixed at the year of our Lord 63, or, according to another account, the year 48. Another tradition makes her survive the crucifixion only 11 years.

Many theological questions regarding the Virgin Mary have been raised among Christians of the various churches, which would be quite out of place here. One of these, which possesses present interest, has been treated under a separate head. See IMMACULATE CONCEPTION. The perpetual virginity of Mary is not explicitly attested in Scripture, and there are even certain phrases which at first sight seem to imply that children were born of her after the birth of Jesus, as that of his being called (Matt. i. 25, Luke ii. 7) her "*first*-born son," and that of James and others being more than once called "brothers of the Lord." On the latter argument, no critic acquainted with the wide scriptural use of the word "brother" would ever rely. The former, which was urged anciently by Helvidius and others, but was rejected by the unanimous voice of tradition, is founded on a phrase susceptible of equal latitude of interpretation. The perpetual virginity of Mary is held as a firm article of belief in the Roman and eastern churches. Protestants hold nothing positively on the subject. The controversies regarding the Virgin Mary have reference to the lawfulness of the worship which is rendered to her in some Christian communities. See MARIOLATRY.

MARY, MOTHER OF JESUS (*ante*), was of the lineage of David and probably a daughter of Heli, who stands in Luke's genealogical record first after Joseph. It is stated concerning her in the New Testament: That the home of her youth was in Nazareth; that she became the espoused wife of Joseph, a descendant of David, but before their marriage was told by the angel Gabriel, sent from heaven to Nazareth, that, by the power of the Holy Ghost, she was to become the mother of the Son of God, whom she should name Jesus, and who, raised to the throne of his father David, would reign thereon forever; that, after Joseph also had been divinely informed of the truth concerning her, she was received by him as his wife, and as such retained her virginity until the birth of Jesus, her first-born son, which took place at Bethlehem under the circumstances related by Luke; that, by divine direction, she and Joseph fled into Egypt with Jesus in order to defeat Herod's designs against him; that after Herod's death she returned with her husband and child to Nazareth; and, except during her annual visits to Jerusalem at the feast—in one at least of which, when Jesus was 12 years old, he went with her—remained with him in their home there until his public life and ministry began. After that time she is brought forward four times only in the New Testament: 1. At the marriage in Cana of Galilee, where she said to Jesus, "They have no wine." 2. At Capernaum, when Jesus was teaching a great multitude who were seated attentively around him. Mary, with his brethren, unable to force her way to him, sent messengers, who cried out to him that his mother and his brethren were standing outside wishing to see and talk with him: Jesus did not go out to her or send her any answer; but, without ceasing his instructions, said "Who is my mother and who are my brethren?" and, stretching forth his hand towards his disciples, thus answered his own question, "My mother and my brethren are those who are hearing and doing the word of God"—and with wider application still to all places and all times—"Whosoever is willing to do the will of my Father in heaven, he is my brother and sister and mother." 3. John records that Mary the mother of Jesus, with three or four of her friends, having been standing firmly by the cross, probably from the beginning of the crucifixion, Jesus, just before his death, seeing her there and the beloved disciple standing by her, said to her, "Woman, behold thy son," and to him, "Behold thy mother." After this, knowing that then all things had been accomplished, he spake his last words and uttered his final cry. Thus, amidst all its brevity, the Scripture narrative makes it clear that she who had heard the first infant cry of Jesus heard also his closing cries of anguish; and from that very hour she was comforted in what became to her a beloved home. It is related, also, that she saw the tomb in which his body was laid. 4. After the ascension of Jesus to heaven Luke records the presence of Mary with the apostles, the company of the women, and the brethren of Jesus in the upper room at Jerusalem; where she and they continued strenuously in prayer until, on the day of Pentecost, the Holy Spirit was poured upon them from on high. This is the last scriptural notice of her, and it supplies the last thing certainly known concerning her earthly life. As the inspired narrative introduces her by recording the heavenly benediction pronounced upon her, and her own magnificent song of humble, grateful praise; so it leaves her praying, in common with the rest of the disciples, for the promised blessing from on high. All beyond the above that is related of

her by multitudes of writers in various ages of the church is mere legend. A tender interest and the respect due to her mysterious and sublime relation to the Christ of God, natural concerning her in the minds of all devout Christians, may have been in some degree prevented by the claims for her worship which have been advanced by large portions of the church.

MARY I., Queen of England, daughter of Henry VIII. by his first wife, Catharine of Aragon, was b. at Greenwich on Feb. 18, 1517. She was in her early years a great favorite with her father, who had her carefully educated after the masculine fashion of her time. Erasmus praises particularly the style of her Latin letters. At the age of seven she was betrothed to the emperor Charles V.; but when Henry sought a divorce from queen Catharine, the Spanish monarch broke off the engagement. Her father then tried to marry her to Francis I. of France, but his design did not succeed. Francis, however, asked for his second son, the duke of Orleans, but Henry in turn refused. After the birth of Elizabeth, Henry's affections were diverted to that princess; and when James V. of Scotland sought the hand of Mary, it was refused, on the ground that the issue of such union might imperil the right of Anne Boleyn's children to the crown. This was virtually condemning Mary to celibacy, and doubtless had the effect of making her still more attached to the Catholic party, to which, on account of her training, her natural tendencies, and the wrongs of her mother, she was already closely allied. Several other matrimonial negotiations, with the prince of Portugal, the duke of Cleves, and the duke of Bavaria, also came to nothing. About this time she was in great danger of losing her life, on account of her strong attachment to her mother's interests. Toward the close of Henry's reign, better prospects opened out for her; in 1544 she was restored to her place in the line of succession, of which she had been deprived, and she lived on very good terms with Catharine Parr, the last of her father's numerous wives. During the reign of her half-brother, Edward VI., she lived in retirement, but had three more offers of marriage—from the duke of Brunswick, the markgraf of Brandenburg, and the infante of Portugal—none of which was accepted. On the death of Edward in 1553 she was proclaimed queen; and after a brief and imbecile struggle on the part of those who advocated the claims of lady Jane Grey, was crowned in October of the same year by Stephen Gardiner, bishop of Winchester. A fierce spirit in favor of the papacy soon began to show itself, although it does not appear that Mary herself was at first disposed to be severe; she even occasionally interfered to mitigate the cruelties of Gardiner and Bonner; but after her marriage with Philip of Spain (July 25, 1554), to whose father she had been betrothed many years before, a worse spirit took possession of her, or at least worse counsels prevailed; and those bloody persecutions began which have given her an odious name in history. Her domestic life was wretched; Philip, whom she loved with a morbid passion, proved a sour, selfish, and heartless husband. She had no children, and exasperation and loneliness working upon a temper naturally obstinate and sullen, without doubt rendered her more compliant to the sanguinary policy of the reactionary bishops. Fortunately for England, her reign was brief. She died—after much suffering from dropsy and nervous debility—Nov. 17, 1558. She has been made the subject of a tragedy by Alfred Tennyson.

MARY II., Queen of Great Britain, 1662–94; b. England; daughter of James II. and Anne Hyde, who was daughter of the earl of Clarendon. At the age of fifteen she was married to William, prince of Orange, and went with him to England in 1689. During the same year parliament declared the crown of England vacant by the abdication of James, and conferred it upon William (III.) and Mary. She is said to have been meek and gentle in her disposition, not interfering in the administration of the government, except in the absence of her husband. She died of the small-pox, and left no children.

MARY, BROTHERS OF, a Roman Catholic society founded at Bordeaux in 1817 by G. J. Cheminade, a priest, for the purpose of instruction; confirmed by the pope in 1839; introduced into the United States in 1849, where in 1875 there were 23 houses.

MARYLAND, one of the original 13 American states, lies immediately s. of Pennsylvania, and is bounded on the e. by Delaware and the Atlantic ocean, between lat. 37° 53′ to 39° 44′ n., and long. 75° 4′ to 79° 33′ west. Area, 11,124 sq.m., or 7,119,360 acres; pop. '70, 780,094; income for the year 1877, $2,109,193. The line of Atlantic coast is but 33 m., but including Chesapeake bay, is 411 miles. This bay, 15 m. wide at its mouth, expands to a breadth of 30 m., with numerous islands, and reaches nearly across the state. The country rises gradually from the coast to the tops of the Alleghanies, with great varieties of formation, including deposits of coal, iron, copper, chromate of iron, silicates and hydrates of magnesia, marl, etc. The climate is temperate, and the soil fertile, producing wheat, Indian corn, cotton, tobacco, apples, plums, peaches, grapes. Its chief towns are Baltimore, Annapolis, Fredericktown, Cumberland. Vast quantities of fruit and of oysters are exported from Maryland. The annual produce of coal is valued at about $2,000,000. Maryland has upwards of 850 m. of railway. In 1870 there were 1779 schools in the state—1487 public, 72 classical, professional, and technical (including 2 universities and 19 colleges), and 220 boarding and other schools. There were also 1316 public libraries, 88 newspapers, and 1389 churches. Maryland was settled by a colony of Roman Catholic gentry from England, under a grant to the second lord Baltimore, 1632, when it received its present name in honor of the English queen, Henrietta Maria.

In 1649 it was made, as has been well said, "a land of sanctuary," by the toleration of all religious denominations; but the Puritans, expelled from Virginia, made great trouble in the colony. Organized as a state in 1776, Maryland took a prominent part in the revolution. In the war of 1861, its sympathies were with the south, and the first blood of the war was shed in Baltimore, several Massachusetts volunteers having been killed on their way to Washington. During the war it was invaded from Virgina, and made the scene of bloody conflicts.

MARYLAND (*ante*). The first settlement within the state was that of capt. William Clayborne and his party, on Kent island, in Chesapeake bay, in 1631. George Calvert, the first lord Baltimore, explored the Virginia settlements and Chesapeake bay in 1628, and was delighted with the country; but being a Roman Catholic, and finding the church of England party had full sway, he is supposed to have returned to his possessions in Newfoundland. In 1632, having returned to England, he obtained from the king a renewal of his Newfoundland charter, enlarged to include the territory now forming the states of Maryland and Delaware. He died before the papers were executed, and they were issued by Charles I. to his son Cecelius Calvert, second lord Baltimore, June 20, 1632. The charter conferred upon him and his heirs forever, absolute ownership of the territory, and also civil and ecclesiastical powers of a feudal sort. The name of Maryland was given to the colony in compliment to the queen, Henrietta Maria. Lord Baltimore did not emigrate to America, but made his brother, Leonard Calvert, manager of the expedition, which consisted of 200 persons. They sailed from Cowes, isle of Wight, Nov. 22, 1633, in two small vessels, the Ark and the Dove, and, after touching at several of the West India islands, landed at point Comfort, Va., Feb. 24, 1634. From this point they sailed, Mar. 3, up the Chesapeake and into the Potomac, landing at an island which they called St. Clement's, where, on the 25th, they "offered for the first time in this region of the world the sacrifice of the mass," and erected a large wooden cross as "a trophy to Christ the Savior," chanting before it on bended knees the litany of the cross. Proceeding n. about nine leagues, they entered a river which they called St. George's, and landed on its right bank, where, on Mar. 27, 1634, with appropriate religious and military ceremonies, they consecrated the spot on which they proposed to build a city, to which they gave the name of St. Mary's, of which scarcely a trace remains. The colonists were nearly all Roman Catholics and gentlemen of wealth and respectability, and the intention of lord Baltimore was to found a Catholic province upon a feudal basis, with a hereditary nobility, primogeniture, etc. This scheme was defeated by the operation of a clause in the charter which prescribed that laws could be made only with the "advice, assent, and approbation of the freemen of said province, or of the greater part of them, or of their delegates or deputies." There was a dispute between the assembly and lord Baltimore as to which of them had the right to initiate legislation, but it was settled in 1638 by the concession of the latter that the power should be exercised by the former, and in the next year the first statutes of Maryland were enacted. Clayborne and his colony on Kent island refused to acknowledge allegiance to the new government, and he and his adherents were expelled. In 1642 a company of Puritans, excluded from Virginia for non-conformity, settled at Providence, now Annapolis, and put themselves in opposition to the government. Clayborne also returned from England and regained possession of Kent island. The governor attempted in vain to dispossess him, and he and his partisans, united with the Puritans, became masters of the province, and in 1645 compelled the governor to flee into Virginia. In 1647 the governor returned with a military force and recovered possession of the province. By act of the assembly in 1639 the Roman Catholic religion was made the creed of the state. Ten years later, in 1649, an act was passed declaring that "no person or persons whatsoever, professing to believe in Jesus Christ, shall from henceforth be any way troubled, molested, or discountenanced for and in respect of his or her religion, nor in the free exercise thereof, nor in any way compelled to the belief or exercise of any other religion against his or her consent." The Puritans continuing still to be turbulent, their settlement by way of conciliation was, in 1650, erected into a separate county named Anne Arundel, and as other Puritans still arrived from England, Charles county was shortly afterward organized for their benefit. Their numbers increased to such an extent that in the next assembly they had a majority. In 1652, the royal government of England having been superseded by the commonwealth, commissioners from the mother country visited Maryland, with whom were associated Clayborne, the troublesome opponent of the government founded under lord Baltimore, and Bennett, the Puritan leader of Anne Arundel county. The authority of the English commonwealth was completely established in the colony, and Kent island was given up to Clayborne, while he also acquired Palmer island at the mouth of the Susquehanna. Gov. Stone was first removed, then reinstated. In 1654 lord Baltimore attempted to regain possession of the province and re-establish the proprietary government, but without success. The Puritans established a commission for the government of the colony, placing capt. Fuller at its head. A severe conflict ensued. Providence (now Annapolis) was attacked Mar. 25, 1655, by the proprietary party; but the assault was repulsed, the whole invading force being either killed or taken prisoners, Gov. Stone among the latter. Many of the prisoners were condemned to death, and several were executed. In 1658,

however, the proprietary government was restored. Charles Calvert, son of lord Baltimore, was governor from 1662 to 1676, when the latter died and the former succeeded to his rights, and appointed Thomas Notely as governor. After the overthrow of the commonwealth in 1688, sir Lionel Copley was sent out as governor, and the capital was removed from St. Mary's to Providence, which was thereafter known as Annapolis. In 1714 Charles Calvert, the lord proprietary, died, and was succeeded by his son, Benedict Leonard Calvert, who in turn died in the following year, and was succeeded by his son Charles, a Protestant. Hart, the last of the royal governors, was retained in office. Baltimore was laid out in 1730, Frederick city was founded in 1745, and Georgetown, now in the District of Columbia, was laid out in 1751. In spite of the efforts of the British government to repress manufactures in the colonies, eight copper furnaces and nine forges were in operation in Maryland in 1749, and wine to some extent was produced. The great staple export was tobacco, which was made a legal tender in 1732 at one penny a pound. Maryland took an active part in the war which resulted in the extinction of the French domination upon this continent. The colony was also among the first to oppose the aggressions of the British government which led to the war of the revolution. As early as 1774 the proprietary government was superseded by the authority of the people. A bill of rights and a constitution were adopted in Nov., 1776. The first republican legislature assembled at Annapolis Feb. 5, 1777, and Thomas Johnson was the first republican governor. Maryland took a most efficient and honorable part in the revolutionary war. In 1783 congress met at Annapolis, and it was there on Dec. 23, at the close of the war, that Washington resigned his commission as general-in-chief. The federal constitution was adopted in the Maryland convention April 28, 1788 by a vote of 63 to 11.

The part of the state called the Eastern Shore, lying between Chesapeake and Delaware bays and the Atlantic, is for the most part level, and in some places swampy. Toward the n. extremity the peninsula is somewhat rocky and broken. The Western Shore, lying between Chesapeake bay and the Potomac, is in the s. portion level and sandy, and in some places marshy; but, n. of the point just above Washington on the Potomac, it is first hilly and afterwards mountainous. The main ranges of the Alleghanies pass through the narrow portion of the state extending westward between Pennsylvania and Virginia. The highest mountains are not more than 2,500 ft. high. The most beautiful scenery in the state is in a part of the Cumberland valley, in Washington co., near the Pennsylvania line. The state has on the Atlantic only 33 m. of coast and not a single good harbor; but Chesapeake bay, extending nearly through the state from s. to n., furnishes a coast-line of nearly 500 miles. The bay is navigable through its whole extent, and has some good harbors. Baltimore, the principal city of the state, lies upon an arm of the Chesapeake called Patapsco bay. The Potomac, the principal river, is navigable for about 125 m. on the w. border. The other rivers of the state are: on the Western Shore, the Wicomico, Patuxent, South Severn, Patapsco, Bush, and Susquehanna; on the Eastern Shore, the Pocomoke, Manokin, Nanticoke, Choptank, St. Michael's, Wye, Chester, Sassafras, Elk. Many of these rivers might properly be called estuaries of Chesapeake bay. Chincoteague, Sinepuxent, and St. Martin's bays are sounds lying between the Eastern Shore and the island reefs and barriers which receive the Atlantic surf. Pocomoke sound, Tangier sound, and Eastern bay are a part of the Chesapeake, in which are numerous islands, among them Kent, Bloodworth's, Holland's, Smith's, Tangier, Halfmoon, and Assateague.

Copper, hematitic iron, galena, and manganese, are found in the central portion of the state, while bituminous coal is abundant in the n.w., and bog-iron in the east. Marble, of several varieties, and limestone and sandstone for building, are abundant in the central portion of the state, while traces of gold, nickel, and cobalt have been found in some places.

The wild animals are those usually found on the Atlantic coast. Bears are common in the w., and even the deer has not been exterminated. The fox, raccoon, and opossum are frequently met with. Wild ducks, in great variety, pigeons, partridges, snipe, and quail are found in immense numbers in the e. part of the state. Fish, of excellent quality, are abundant, and the oysters of Chesapeake bay are large and finely flavored.

The principal forest trees of the lowlands are the gum, cypress, cedar, juniper, dogwood, magnolia, holly, elm, cherry, locust, persimmon, beech, sycamore, sassafras, poplar, and red maple, while in the mountainous districts are found several species of oak, maple, walnut, hickory, ash, chestnut, birch, pine, and spruce.

The soil of the e. part of the state is a sandy loam, easily made productive by fertilization. Peaches and market-garden products grow here in great perfection. In the valleys of the central and northern portions of the state the soil is exceedingly fertile, producing large crops of tobacco, wheat, and corn. The climate is equable, subject neither to the severe cold of the north nor to the extreme heat of the south. The low and marshy lands on the Chesapeake and the lower Potomac are to some extent miasmatic, but the rest of the state is generally healthful. The mean annual temperature varies from 54° to 64°. The mercury rarely falls below zero, while the summers are little if any warmer than in Pennsylvania.

The number of farms in 1870 was 27,000; number of acres of improved farm land, 2,914,007; cash value of farms, $170,369,684; of farming implements and machinery,

$5,268,676; amount of wages paid in the year, $8,560,367; value of all farm productions, $35,343,927; value of orchard products, $1,319,405; of produce of market gardens, $1,039,782; of forest products, $613,209; of home manufactures, $63,608; of animals slaughtered or sold for slaughter, $4,621,418; of live stock, $18,433,698; wheat produced, 5,774,503 bush.; rye, 307,089 bush; corn, 11,701,817 bush.; oats, 3,221,643 bush.; Irish potatoes, 1,632,205 bush.; sweet potatoes, 218,706 bush.; tobacco, 15,785,339 lbs.; wool, 435,213 lbs.; butter, 5,014,729 lbs.; cheese, 6,732 lbs.; hops, 2,800 lbs.; flax, 30,760 lbs.; maple sugar, 70,464 lbs.; honey, 118,938 lbs.; wine, 11,583 gallons; milk sold, 1,520,101 gals.; sorgham molasses, 28,563 gals.; hay, 223,119 tons; number of horses, 89,696; mules and asses, 9,830; milch cows, 94,794; working oxen, 22,491; other cattle, 98,074; sheep, 129,697; swine, 257,893; horses not on farms, 12,520; cattle not on farms, 16,040. The wheat crop of 1873 has been estimated at 5,262,000 bush., and valued at over $8,000,000; the rye crop at 309,000 bush., valued at $247,200; corn, 10,451,000 bush., valued at $7,106,680; Irish potatoes, 1,336,000 bush., valued at $935,000; oats, 2,798,000 bush., valued at $1,231,120; tobacco, 19,300,000 lbs., valued at $1,486,100; number of horses, 104,500; of mules and asses, 10,700; of milch cows, 96,900; cattle, 125,600; of sheep, 133,200; of swine, 256,200.

In 1870 Maryland had 5,812 manufacturing establishments, employing 44,860 persons, and having capital amounting to $36,438,729; wages paid, $12,682,817; value of annual products, $76,593,613. The chief lines of manufacturing industry were: refining sugar and molasses, clothing, cotton goods, flouring-mill products, boots and shoes, iron, tin, copper, and sheet-iron ware, tobacco and cigars, canned fruits and vegetables, canned oysters and fish, bread and bakery products, leather, furniture, lumber, malt and distilled liquors, bricks, printing and publishing, and copper smelting. The value of the oysters and fish canned in Baltimore in 1874 was estimated at more than $6,000,000.

The valuation of the property of the state for 1879 was $466,470,995. Adding to this the stock and assets of corporations, estimated at $42,472,896, to total assessment for taxation amounted to $509,213,891. The average amount of tobacco received and shipped for the seven years ending Sept., 1878, was 52,758 hhds. per annum, or an aggregate of 369,306 hhds. The cost of the labor of handling and inspecting was $532,532. The estimated production of the Clearfield coal region for 1879 was about 1,600,000 tons, an increase over the previous year of 330,000 tons. The Cumberland region shipped 1,702,993 tons.

In 1875 there were in Maryland and the District of Columbia 1825 m. of railroad, costing with their equipment $57,318,219. The principal roads are: the Baltimore and Ohio, one of the four great trunk roads across the continent; the Annapolis and Elk Ridge; the Philadelphia, Wilmington, and Baltimore; the Philadelphia and Baltimore Central; the Northern Central; the Frederick and Pennsylvania; the Cumberland and Pennsylvania; the Western Maryland, and the Southern Maryland.

The foreign commerce of the state is confined almost entirely to Baltimore. The imports for the year ending June 30, 1874, were valued at $29,302,311, the foreign exports at $179,598; domestic exports, $27,514,721. There were entered in Baltimore in 1870, from foreign countries, 355 American vessels, aggregating 124,584 tons burden, and employing 3,982 men and boys, and 345 foreign vessels, of 147,706 tons burden, and employing 5,023 men and boys. Clearances in the same year for foreign ports, 256 American vessels, of 91,652 aggregate tons and manned by 3,006 men and boys; and 348 foreign vessels, of 154,917 tons burden, and employing 4,980 men and boys. The coastwise trade embraces oysters, which are taken in immense quantities in Chesapeake bay. Not less than 15,000,000 bush., mostly canned or in jars, are shipped annually, representing a value of from $15,000,000 to $20,000,000. Flour, grain, tobacco, coffee, refined sugar, molasses, cotton, coal, wool, hides, leather, provisions, guano, naval stores, iron, whisky, fish and canned fruits are also among the articles which enter largely into the coastwise and internal traffic. In the year ending June 30, 1874, 1943 steamers engaged in this branch of commerce, and aggregating 1,588,958 tons, entered the ports of the the state. Number of sailing vessels in the same trade, 414. The clearances of vessels in the same trade during the same year were: steamers, 2,046, sailing vessels, 348. The total of entrances and clearances was 4,781 vessels, of 3,308,703 tons burden, and manned by 94,170 men. The value of the exports from Baltimore in 1877 was $39,815,286. The shipments of petroleum in 1876 amounted to 40,812,598 gals.

The number of national banks in 1874 was 33, with an aggregate capital of nearly $14,000,000; and an outstanding circulation of over $9,000,000. In 1835 there were also 13 state banks, with a capital of nearly $4,000,000; also 5 savings banks, with deposits of over $17,000,000, and 22 private banks. In 1878 there were 13 fire insurance companies, all in Baltimore, their premiums in the state amounting to $439,577.29, and their losses to over $68,000. There was also in Baltimore one marine insurance company, premiums $24,000, losses $10,000. There were also in the state 15 mutual insurance companies, premiums nearly $123,000, losses $91,000. Number of fire and marine insurance companies of other states doing business in Maryland, 101—premiums nearly $850,000, losses over $430,000. There were 2 Maryland life insurance companies—premiums $104,000, payments to policy-holders nearly $85,000; 26 life insurance companies of other states, premiums over $1,000,000, payments $1,033,000. The aggregate capital of all the joint-stock insurance companies of the state was $2,728,855; assets, $5,446,996;

liabilities, $3,816,843. The 15 mutual fire insurance companies had assets amounting to nearly $4,000,000, while their liabilities were over $166,000.

The debt of the state, on which interest has to be provided, is a little short of $8,000,000. The receipts of the state treasury for the fiscal year ending Sept. 30, 1879, were $2,126,326; in treasury before, $204,165; total, $2,320,491; disbursements, $1,774,283; balance in treasury, $556,208.

The population of Maryland has increased steadily from the first. In 1790 it was 319,728; in 1850, 583,034; in 1870, 780,894, of whom 175,391 were colored; in 1880, 934,632. The number of church organizations in 1870 was 1420, of church edifices 1389; amount of church property, $12,038,650. The principal denominations were Baptists (including Mennonites, Tunkers, etc.), Episcopalians, Methodists, Roman Catholics, Presbyterians, Lutherans, Friends, German Reformed, and United Brethren in Christ.

The latest school statistics are those of the year ending July 31, 1878. Number of schools, 1989; pupils, 156,274; average attendance, 81,839; number of teachers, 3,071. In Baltimore the schools were opened 10 months of the year; in other counties, a little over 8 months. Total expenditures of the year for school purposes, $1,593,259. There are separate schools for colored children. The state normal school at Baltimore was opened in 1865, and in 1870 had an income from productive funds of $9,500, and a library of 1250 volumes. The Howard normal school for colored pupils has an annual income of $2,000, and a library of 1750 volumes. Normal instruction is also given in St. John's college, Annapolis. The provisions for higher education in Maryland are comparatively ample. The McDonogh bequest, from which the sum of $800,000 had been realized up to 1870, is the foundation of a farm school for boys, now in successful operation. The Peabody institute in Baltimore, endowed by the late Mr. George Peabody with $1,200,000, besides buildings, is intended to found a great library, support an extensive system of lectures, and a conservatory of music. The Johns Hopkins university, founded in 1874 by the late Johns Hopkins of Baltimore, and endowed by him with the sum of $3,500,000, has already taken rank among the best universities of the country. The state agricultural college in Prince George's co. was founded upon the avails of the public lands given for the purpose to the state by the United States. It has a farm of 300 acres. It embraces a collegiate course of four and a scientific course of three years. Provision is also made for students desiring to remain but a single year. The other colleges of the state are Frederick college, at Frederick, Loyola college at Baltimore; Rock Hill college and St. Charles college at Ellicott city; St. John's college at Annapolis; Washington college at Chestertown; Western Maryland college at Westminster. Number of instructors in these institutions, 113; of students, 629. There are also several flourishing seminaries for the instruction of young ladies, and a number of professional schools. The United States naval academy at Annapolis has a library of 16,828 volumes. There are two medical schools; one of them a department of Washington university, the other of the university of Maryland. The Maryland college of pharmacy was founded in 1841; the Baltimore college of dentistry, the oldest of the kind in the world, was founded in 1840. The Maryland dental college was founded in 1873. In 1870, there were in the state 3,353 libraries, containing 1,713,483 volumes; of these, 2,037, containing 1,142,538 volumes, were private. There were 88 newspapers and periodicals —8 daily, 1 tri-weekly, 2 semi-weekly, 69 weekly, and 8 monthly.

The state institutions are the penitentiary, the asylum for the blind (white), and that for the colored blind and deaf at Baltimore; the hospital for the insane, at Spring Grove, Baltimore co.; the institution for the deaf and dumb, at Frederick; and house of refuge for juvenile delinquents, near Baltimore.

The governor of the state is elected for four years. His veto can be overcome only by a three-fifths vote of both houses of the legislature. He has a salary of $4,500. The governor, comptroller, and treasurer constitute the board of public works. The legislature, which meets biennially, consists of a senate and house of representatives. The senators, 26 in number, one from each county, and one from each of the three legislative districts of Baltimore, are elected for four years, one-half retiring biennially. The delegates, 85 in number, are elected for two years by districts defined by the legislature after each census. Members of the legislature are paid $5 per day during the sessions, besides mileage. The court of appeals, composed of the chief judges of the first seven circuits and a judge specially elected in Baltimore, has appellate jurisdiction only. The state is divided into 8 judicial circuits, the city of Baltimore constituting the eighth. In each circuit, except the eighth, a chief judge and two associate judges are elected; and in each county a circuit court is held, having original jurisdiction, both civil and criminal, and appellate jurisdiction of the judgments of justices of the peace. The city of Baltimore has five courts, viz.: the superior court, the court of common pleas, the city court, the circuit court, and the criminal court. A chief judge and four associate judges, constituting the supreme bench of Baltimore, designate one or more of their number to hold these several courts, and any three or more to hold general terms with limited appellate powers. Judges are elected by the people of their respective circuit for a term of 15 years, but cannot serve after they are 70 years of age. The legislature is prohibited from lending the credit of the state to any individual, association, or corporation. Amendments to the constitution must be proposed by three-fifths of each house of the legislature and ratified by the people. Once in every

20 years the people must vote upon the question of holding a convention to revise the constitution. A married woman may acquire, hold, and manage property independently of her husband, and dispose of the same as if single. Her husband must join her, however, in the execution of any deed.

The position of Maryland in the war of the rebellion was peculiar. As a slaveholding state, her sympathies were naturally to a great extent with the south; but her proximity to the north served to modify her feelings in this respect and to keep her from joining the confederacy. A considerable portion of the people were in favor of secession, but a very large majority were strongly opposed. Great efforts were made to keep the state in a neutral position, but without success. A considerable number of men enlisted in the confederate army, but of those who remained at home a majority were loyal to the union. Attempts were made in Baltimore in the first days of the war to prevent the passage of union troops through that city to Washington and the south, and several Massachusetts soldiers were killed in consequence; but the enemies of the union were effectually subdued by the power of the national government, aided by the better portion of the citizens of the state. In spite of the circumstances above mentioned, Maryland contributed 49,780 men to the union armies. The battle of Antietam and several others of less importance were fought on Maryland soil.

The electoral votes of Maryland for president and vice-president have been as follows:—1789, 6 for Washington and R. H. Harrison of Maryland—2 vacancies; 1792, 8 for Washington and Adams; 1796, 7 for Adams and 4 for Jefferson for president; and 4 for Pinckney, 3 for Burr, 2 for John Henry, and 2 vacancies, for vice-president. 1800, 5 each for Jefferson and Burr for president; and 5 each for Adams and Pinckney for vice-president; 1804, 9 for Jefferson and 2 for Pinckney for president; and 9 for Clinton and 2 for King for vice-president; 1812, 6 for Madison and 5 for Geo. Clinton for president; and 6 for Gerry and 5 for Jared Ingersoll for vice-president; 1816, 8 for Monroe and 3 vacancies for president; and 8 for Tompkins and 3 vacancies for vice-president; 1820, 11 for Monroe for president; and 10 for Tompkins and 1 for Robert C. Harper for vice-president; 1824, 7 for Jackson, 3 for J. Q. Adams, and 1 for W. H. Crawford for president; and 10 for Calhoun and 1 for Jackson for vice-president; 1828, 5 for Jackson and 6 for J. Q. Adams for president; and 5 for Calhoun and 6 for Rush for vice-president; 1832, 3 for Jackson, 5 for Clay, and 2 vacancies, for president; and 5 for Sargeant, 3 for Van Buren, and 2 vacancies for vice-president; 1836, 10 for Harrison and R. M. Johnson; 1840, 10 for Harrison and Tyler; 1844, 8 for Clay and Frelinghuysen; 1848, 8 for Taylor and Fillmore; 1852, 8 for Pierce and King; 1856, 8 for Fillmore and Donelson; 1860, 8 for Breckinridge and Lane; 1864, 7 for Lincoln and Johnson; 1868, 7 for Seymour and Blair; 1872, 8 for Thomas A. Hendricks and B. Gratz Brown; 1876, 8 for Tilden and Hendricks; 1880, 8 for Hancock and English.

MARY OF THE INCARNATION (MARIE GUYARD), 1599–1672, b. France; married at the age of 17, a silk manufacturer named Martin, who died two years afterwards. She carried on the silk factory till her son reached the age of 12, when, Jan. 25, 1631, she became an Ursuline nun. In 1639 she settled in Canada, and founded an Ursuline convent in Quebec. She studied and became familiar with some of the Indian languages, and gave instruction to French and Indian scholars. In the political affairs of New France her judgment was highly esteemed, and she sought to impress upon the home government the necessity of controlling the mouth of the Hudson, as a means of protection against Dutch and English assaults. Her life has been written by her son, Dom Claude Martin, who became a Benedictine monk; and by Father Charlevoix, and there is a modern biography of her by the abbé Casgrain, which appeared at Quebec, in 1864.

MARY MAGDALE'NE. See MAGDALENE, MARY, *ante*.

MARYPORT, a seaport of Cumberland, England, at the mouth of the Ellen, 28 m. s.w. of Carlisle by railway. Its origin dates from 1750. Shipbuilding and its kindred employments are carried on extensively, and there are in operation iron-foundries, sawmills, flour-mills, tanneries, breweries, etc. A very large quantity of coal and coke is shipped, especially to Ireland. Maryport has abundant railway connection, and possesses a floating dock and two patent slips. It is a place of resort for sea-bathing. In 1876, 520 vessels, measuring 63,767 tons, entered the port, and 2,002, measuring 230,977 tons, cleared. Pop. '71, 7,443.

MARY, SOCIETY OF, an association of Roman Catholic priests, established at Lyons, France, in 1815, by J. C. M. Colin; sanctioned by the pope in 1831, 1836, and 1873; introduced into the United States in 1862. The principal objects of the association are religious instruction and domestic and foreign missions.

MARY STUART, QUEEN OF SCOTS. This beautiful and accomplished, but most unhappy princess was the daughter of king James V. of Scotland by his second wife, Mary of Lorraine, daughter of Claude, duke of Guise, and widow of Louis of Orleans, duke of Longueville. She was b. at Linlithgow, on Dec. 8, 1542. Her misfortunes may be said to have begun with her birth. Its tidings reached her father on his deathbed at Falkland, but brought him no consolation. "The devil go with it!" he muttered, as his thoughts wandered back to the marriage with Bruce's daughter, which

brought the crown of Scotland to the Stuarts—"it came from a woman, and it will end in a woman!" Mary became a queen before she was a week old. Before she was a twelvemonth old, the regent Arran had promised her in marriage to prince Edward of England, and the Scottish parliament had declared the promise null. War with England followed, and at Pinkie Cleuch the Scots met a defeat only less disastrous than Flodden. But their aversion to an English match was unconquerable; they hastened to place the young queen beyond the reach of English arms, in the island of Inchmahome, in the lake of Monteith, and to offer her in marriage to the eldest son of Henry II. of France, and Catharine de' Medici. The offer was accepted; and in July, 1548, a French fleet carried Mary from Dumbarton, on the Clyde, to Roscoff, in Brittany, whence she was at once conveyed to St. Germain-en-Laye, and there affianced to the dauphin.

Her next ten years were passed at the French court, where she was carefully educated along with the king's family, receiving instructions in the art of making verses from the famous Ronsard. At a somewhat later period, she had the great Scottish scholar Buchanan for her Latin master. On April 24, 1558, her marriage with the dauphin, who was about two years younger than herself, was celebrated, with every circumstance of pomp and splendor, in the church of Notre-Dame, at Paris. It was agreed, on the part of Scotland, that her husband should have the title of king of Scots; but this was not enough for the grasping ambition of France, and Mary was betrayed into the signature of a secret deed, by which, if she died childless, both her Scottish realm and her right of succession to the English crown (she was the great-granddaughter of king Henry VII.) were conveyed to France. On July 10, 1559, the death of the French king called her husband to the throne by the title of Francis II. The government passed into the hands of the queen's kinsfolks, the duke of Guise and the cardinal of Lorraine; but their rule was short-lived. The feeble and sickly king died on Dec. 5, 1560, when the reins of power were grasped by the queen-mother, Catharine de' Medici, as regent for her son, Charles IX. Mary must have been prepared, under almost any circumstances, to quit a court which was now swayed by one whom, during her brief reign, she had taunted with being "a merchant's daughter." But there were other reasons for her departure from France. Her presence was urgently needed in Scotland, which the death of her mother, a few months before, had left without a government, at a moment when it was convulsed by the throes of the Reformation. Her kinsmen of Lorraine had ambitious projects for her marriage; great schemes were based on her nearness of succession to the English crown; and both these, it was thought, might be more successfully followed out when she was seated on her native throne.

She sailed from Calais on the 15th, and arrived at Leith on Aug. 19, 1561, having escaped the English ships-of-war which Elizabeth despatched to intercept her. She wept as the shores of France faded from her sight, and her tears flowed anew when she beheld the rudeness and poverty of Scotland. Her government began auspiciously. The Reformation claimed to have received the sanction of the Scottish parliament, and if Mary did not formally acknowledge the claim, she was at least content to leave affairs as she found them, stipulating only for liberty to use her own religion—a liberty which Knox and a few of the more extreme Reformers denounced as a sin against the law of God. She is said to have rejected the violent counsels of the Roman Catholics; it is certain that she surrounded herself with Protestant advisers, her chief minister being her illegitimate brother, James Stuart, an able if ambitious statesman, whom she soon afterwards created earl of Murray. Under his guidance, in the autumn of 1562, she made a progress to the n., which, whatever was its design, ended in the defeat and death of the earl of Huntly, the powerful chief of the Roman Catholic party in Scotland.

Meanwhile, the courts of Europe were busy with schemes for Mary's marriage. The king of Sweden, the king of Denmark, the king of France, the arch-duke Charles of Austria, Don Carlos of Spain, the duke of Ferrara, the duke of Nemours, the duke of Anjou, the Scottish earl of Arran, and the English earl of Leicester were proposed as candidates for her hand. Her own preference was for Don Carlos, the heir of what was then the greatest monarchy in Christendom; and it was not until all hopes of obtaining him were quenched, that she thought seriously of any other. Her choice fell, somewhat suddenly, on her cousin, Henry Stuart, Lord Darnley, son of the earl of Lennox, by his marriage with a granddaughter of king Henry II. of England. He was thus among the nearest heirs to the English crown, and his claims to the succession were believed to have the support of the great body of English Roman Catholics. But except this, and his good-looks, he had no other recommendation. He was weak, needy, insolent, and vicious; his religion, such as it was, was Roman Catholic; his house had few friends and many enemies in Scotland; and he was two or three years younger than Mary. Her best friends, both Roman Catholic and Protestant, warned her against him, but in vain. The marriage was celebrated at Holyrood on July 29, 1565. It was the signal for an insurrection by Murray and the Hamiltons, who hoped to be joined by the whole Protestant party. But their hope was disappointed; and the queen, taking the field in person, at once quelled the revolt, and chased the rebels beyond the Tweed.

Her triumph was scarcely over when her eyes began to open to the great mistake of her marriage. Her husband's worthlessness and folly became only too apparent; she was disgusted by his debauchery, and alarmed by his arrogance and ambition. She

had given him the title of king, but he now demanded that the crown should be secured to him for life, and that if the queen died without issue it should descend to his heirs. Mary hesitated to comply with a demand which would have set aside the settled order of succession; and what she refused to grant by favor, the king prepared to extort by force.

Mary's chief minister, since Murray's rebellion, had been David Rizzio, a mean-looking Italian of great ability and many accomplishments; but generally hated beyond the palace walls as a base-born foreigner, a court favorite, and a Roman Catholic. The king and Rizzio had been sworn friends, sharing the same table, and even sleeping in the same bed; but the king was now persuaded that it was Rizzio who was the real obstacle to his designs upon the crown. In this belief he entered into a formal compact with Murray, Ruthven, Morton, and other chiefs of the Protestant party, undertaking, on his part, to prevent their attainder, or procure their pardon, and to support and advance the Protestant religion; while they, on the other part, bound themselves to procure the settlement of the crown upon him and his heirs, and to take and slay, if need were, even in the queen's palace and presence, every one who opposed it. The result of this conspiracy was the murder of Rizzio on Mar. 9, 1566, the king leading the way into the queen's cabinet, and holding her in his grasp while the murderers dragged the poor Italian into an ante-chamber, and, mangling his body with more than 50 wounds, completed what they believed, and Knox pronounced to be, "a just act and most worthy of all praise." When Mary learned what had been done she broke out in reproaches against the king as to blame for all. "I shall be your wife no longer," she told him, "and shall never like well till I cause you have as sorrowful a heart as I have at this present." As had been agreed beforehand among the conspirators, Mary was kept prisoner in Holyrood; while the king, of his own authority, dismissed the parliament which was about to forfeit Murray and his associates in the late insurrection. The plot was thus far successful; but Mary no sooner perceived its objects than she set herself at work to defeat them. Dissembling her indignation at her husband's treachery and the savage outrage in which he was the ring-leader, she succeeded by her blandishments in detaching him from the conspirators, and in persuading him not only to escape with her from their power by a midnight flight to Dunbar, but to issue a proclamation in which he denied all complicity in their designs. The conspiracy was now at an end; Ruthven and Morton fled to England, while Murray, by renouncing their cause, hastened to make his peace with the queen; and the king, hated by both sides, because he had betrayed both sides, became an object of mingled abhorrence and contempt.

It was an aggravation of the murder of Rizzio that it was committed, if not in the queen's presence, at least within a few yards of her person, only three months before she gave birth (on June 19, 1566) to the prince who became king James VI. As that event drew near the queen's affection for her husband seemed to revive; but the change was only momentary; and before the boy's baptism, in December, her estrangement from the king was greater than ever. Divorce was openly discussed in her presence, and darker designs were not obscurely hinted at among her friends. The king, on his part, spoke of leaving the country; but before his preparations were completed he fell ill of the small-pox at Glasgow. This was about Jan. 9, 1567. On the 25th Mary went to see him, and traveling by easy stages brought him to Edinburgh on the 31st. He was lodged in a small mansion beside the kirk of the field, nearly on the spot where the s.e. corner of the university now stands. There Mary visited him daily, and slept for two nights in a room below his bed-chamber. She passed the evening of Sunday, Feb. 9, by his bedside, talking cheerfully and affectionately with him, although she is said to have dropped one remark which gave him uneasy forebodings—that it was much about that time twelvemonth that Rizzio was murdered. She left him between 10 and 11 o'clock to take part in a masque at Holyrood, at the marriage of a favorite valet. The festivities had not long ceased in the palace when, about two hours after midnight, the house in which the king slept was blown up by gunpowder; and his lifeless body was found in the neighboring garden.

The chief actor in this tragedy was undoubtedly James Hepburn, earl Bothwell, a needy, reckless, vainglorious, profligate noble, who, since Murray's revolt, and still more since Rizzio's murder, had enjoyed a large share of the queen's favor. But there were suspicions that the queen herself was not wholly ignorant of the plot, and these suspicions could not but be strengthened by what followed. On April 12 Bothwell was brought to a mock-trial and acquitted; on the 24th he intercepted the queen on her way from Linlithgow to Edinburgh, and carried her, with scarcely a show of resistance, to Dunbar. On May 7 he was divorced from the young and comely wife whom he had married little more than a twelvemonth before; on the 12th Mary publicly pardoned his seizure of her person, and created him duke of Orkney; and on the 15th—only three months after her husband's murder—she married the man whom every one regarded as his murderer.

This fatal step at once arrayed her nobles in arms against her. She was able to lead an army against them, but it melted away without striking a blow on the field of Carberry (June 15), when nothing was left to her but to abandon Bothwell and surrender herself to the confederated lords. They led her to Edinburgh, where the insults of the rabble and grief at parting with Bothwell threw her into such a frenzy that she refused

all nourishment, and rushing to the window of the room in which she was kept prisoner called for help, and showed herself to the people half-naked, with her hair hanging about her ears.

From Edinburgh, she was hurried to Loch Leven, where, July 24, she was prevailed upon to sign an act of abdication in favor of her son, who, five days afterwards, was crowned at Stirling. Escaping from her island prison May 2, 1568, she found herself in a few days at the head of an army of 6,000 men. On the 12th, it was met and defeated by the regent Murray at Langside, near Glasgow. Four days afterwards, in spite of the entreaties of her best friends, Mary crossed the Solway, and threw herself on the protection of queen Elizabeth, only to find herself a prisoner for life. From Carlisle, her first place of captivity, she was taken, in July, to Bolton; from Bolton, she was carried, in February, 1569, to Tutbury; from Tutbury, she passed in succession to Wingfield, to Coventry, to Chatsworth, to Sheffield, to Buxton, and to Chartley. She was removed, last of all, to Fotheringhay, in September, 1586, there to be tried on a charge of complicity in a plot against the life of Elizabeth. Sentence of death was pronounced against her Oct. 25; but it was not until Feb. 1, 1587, that Elizabeth took courage to sign the warrant of execution. It was carried into effect on the 8th, when Mary laid her head upon the block with the dignity of a queen and the constancy and resignation of a martyr. Five months afterwards, her body was buried with great pomp at Peterborough, whence, in 1612, it was removed to king Henry VII.'s chapel at Westminster, where it still lies in a sumptuous tomb erected by king James VI.

The character of Mary was long one of the most fiercely-vexed questions of history, and is still in debate, although the great preponderance of authority seems now to be on the side of those who believe in her criminal love for Bothwell and her guilty knowledge of his conspiracy against her husband's life. Her beauty and accomplishments have never been disputed. "She was confessed by every one"—says Mr. Joseph Robertson, one of the latest writers on her life—"she was confessed by every one to be the most charming princess of her time. Her large sharp features might perhaps have been thought handsome rather than beautiful, but for the winning vivacity and high joyous spirit which beamed through them. It has been questioned whether her eyes were hazel or dark gray, but there is no question as to their starlike brightness. Her complexion, although fresh and clear, would seem to have been without the brilliance so common among our island beauties. Her hair appears to have changed with her years from a ruddy yellow to auburn, and from auburn to dark brown or black, turning gray long before its time. Her bust was full and finely shaped, and she carried her large stately figure with majesty and grace. She showed to advantage on horseback, and still more in the dance. The charm of her soft, sweet voice is described as irresistible; and she sang well, accompanying herself on the harp, the virginals, and still oftener on the lute, which set off the beauty of her long, delicate, white hand. The consciousness how that hand was admired may have made it more diligent in knitting and in embroidery, in both of which she excelled. Her manner was sprightly, affable, kindly, frank perhaps to excess, if judged by the somewhat austere rule already beginning to prevail among her Scottish subjects. She spoke three or four languages, was well and variously informed, talked admirably, and wrote both in prose and in verse, always with ease, and sometimes with grace or vigor. In the ring of which she was the center, were statesmen like Murray and Lethington, soldiers like Kyrkcaldy of Grange, men of letters like Buchanan, Lesley, sir Richard Maitland, and sir James Melville. The first poet of France published verses deploring his absence from her brilliant court; Damville, the flower of French chivalry, repined at the fate which called him away from it so soon; Brantôme and the younger Scaliger delighted to speak, in old age, of the days which they passed beneath its roof."

Mary's prose-writings have been collected by the enthusiastic devotion of prince Alexander Labanoff, in his *Recueil des Lettres de Marie Stuart*. Setting aside the twelve sonnets which she is said to have written to Bothwell, and which survive only in a French version of an English translation, no more than six pieces of her poetry, containing in all less than 300 lines, are now known. They have no remarkable merit. The best is the poem of eleven stanzas on the death of her first husband, Francis II., printed by Brantôme. The longest is a *Meditation* of a hundred lines, written in 1572, and published two years afterwards by her ever faithful follower, bishop Lesley of Ross. All are in French, except one sonnet, which is in Italian. The sweetly simple lines beginning, "Adieu, plaisant pays de France," so often ascribed to her, are the work of A. G. Meusnier de Querlon, a French journalist, who died in 1780. A volume of French verse on the *Institution of a Prince*, which she wrote for the use of her son, has been lost since 1627, along with a Latin speech in vindication of learned women, which, when no more than thirteen, she delivered in the hall of the Louvre, in presence of the French court.

To enumerate all that has been written on Mary would fill a volume. Among the chief works are S. Jebb's *De Vita et Rebus Gestis Mariæ Scotorum Reginæ* (Lond. 1725, 2 vols. fol.); J. Anderson's *Collections Relating to the History of Mary, Queen of Scotland* (Lond. 1727–28, 4 vols. 4to); bishop Keith's *History of the Affairs of Church and State in Scotland* (Edin. 1734, fol.; 1844–1850, 3 vols. 8vo); W. Goodall's *Examination of the Letters said to be written by Mary, Queen of Scots, to James, Earl of Bothwell* (Edin. 1754, 2 vols. 8vo); Principal Robertson's *History of Scotland*; W. Tytler's *Inquiry into the Evi-*

dence against Mary, Queen of Scots (Edin. 1759, 8vo; Lond. 1790, 2 vols. 8vo); M. Laing's *History of Scotland;* G. Chalmers's *Life of Mary, Queen of Scots* (1818, 2 vols.; 1822, 3 vols.); P. F. Tytler's *History of Scotland;* Prince Labanoff's *Recueil des Lettres de Marie Stuart* (1844); David Laing's edition of *John Knox's History of the Reformation* (1846–48); Miss Agnes Strickland's *Lives of the Queens of Scotland* (Edin. 1850–59, 8 vols. 8vo); A. de Montaiglon's *Latin Themes of Mary Stuart* (Lond. 1855, 8vo); Prince Labanoff's *Notice sur la Collection des Portraits de Marie Stuart* (1856); M. Miguet's *Histoire de Marie Stuart* (1852), M Teulet's *Lettres de Marie Stuart* (1859); M. Cheruel's *Marie Stuart et Catherine de Medicis* (1858); Robertson's *Catalogues of the Jewels, Dresses, Furniture, Books, and Paintings of Mary, Queen of Scots* (1863); Hosack's *Mary, Queen of Scots, and her Accusers* (1870–74); *History of Mary Stuart, Queen of Scots,* translated from the MSS. of prof. Petit, by C. de Flandre (1874); *Marie Stuart: son Procès et son Exécution, d'après le Journal inédit de Bourgoing,* by Chantelauze (1876).

The best representations of Mary are the contemporary portraits by the French painter, Francis Clouet, more commonly called Jehannet or Janet, and the statue, by an unknown sculptor, on her tomb at Westminster. All portraits which cannot be reconciled with these types may safely be rejected as spurious.

MARYSVILLE, a city of California, U. S., on the north bank of the Yuba river, 100 m. n.n.e. of Benicia, and 50 m. n. of Sacramento, having steam-boat communication with San Francisco. It is a great resort of gold-miners, and has a variable population, given in the census of 1870 at 4738.

MARYSVILLE (*ante*), a city in n. California, incorporated 1851; at the confluence of the Yuba river and the navigable Feather river, opposite Yuba city with which it is connected by a bridge. It is at the junction of the Roseville to Redding division of the Central Pacific, and the Oroville to Marysville branch, and is the largest and most important city in the state n. of Sacramento; pop. '70, 4,738. It is 116 m. from San Francisco, and 70 m. by water from Sacramento, and being at the head of navigation, surrounded by fertile agricultural and rich mining districts, is the center of an important trade. It does an extensive commission business, and is engaged largely in manufactures. It is built, mostly of brick, on a level plain, and is regularly laid out with wide streets. It is supplied with water, lighted with gas, has 4 banks, 8 churches, a convent, graded public schools and 8 private institutions of learning, a masonic hall, a public library, 5 hotels, and manufactories of carriages, woolen mills, steam flour mills, breweries, and iron foundries

MARYVILLE, a t. in e. Tennessee, the present s. terminus of the Knoxville and Augusta railroad; pop. '70, 811. It is the seat of Maryville college, a Presbyterian institution, organized 1819, chartered 1842; open to both sexes, with a distinctive course of 4 years for ladies, and in '74, a library of 2,000 vols. The college buildings, 3 in number, costing $50,000, are pleasantly located on an estate of 65 acres. The Society of Friends have a school here called the Freedman's college. In the town are 7 churches, 1 newspaper, flour and saw mills, a tannery, and a manufactory of woolen goods.

MASACCIO, 1401-43; b. San Giovanni Val d'Arno, Florence, in the early part of the 15th century. His real name was Tommaso Guidi, but on account of his incapacity for the duties of life he was nicknamed at an early age Tommasaccho, shortened to *Masaccio,* or *Helpless Tom.* He received his first lessons in art from Masolino da Panicale. He was employed under him in painting the frescos in the Brancacci chapel at Florence. He studied the sculptures of Ghiberti and Donatello, and learned perspective from Brundleschi. About 1430 he visited Rome, where he executed several important works. In 1434, on the return of Cosmo de Medici from exile, he went back to Florence, and was engaged to complete the paintings of the Brancacci, left unfinished by the death of his master, Marsolino. When in Rome he painted in the church of St. Clemente a series of frescos from the life of St. Catharine. "By the easy posture of his figures, the simplicity and dignity of his draperies, and his natural and harmonious coloring," he surpassed all his contemporaries, and introduced a new era in the annals of painting. He had great readiness of invention and unusual truth and elegance of design, and was remarkably well-skilled in perspective. The frescos in the church of the Carmine at Florence were his masterpieces, and were carefully studied by Raphael and other great painters of the 15th and 16th centuries. In his epitaph, written by Annibal Cavo, it is said that Michael Angelo, who, as the teacher of other painters, was the pupil of Masaccio. His portrait by himself is in the national gallery. He was envied by his competitors, and some think that he was poisoned.

MASANIELLO (properly, TOMMASO ANIELLO), a fisherman of Amalfi, was the leader of the revolt which took place in Naples in July, 1647, against the Spanish viceroy, the duke of Arcos. The people had been exasperated by oppression, and great excitement had been produced by a new tax laid upon fruit. Masaniello himself was indignant at the rude treatment which his wife had received when she was detected in the attempt to smuggle a little flour. He entered into a conspiracy with some others who cherished feelings similar to his own; and an opportunity being afforded them by a tumult at the customs' houses on July 7, 1647, when the new tax on fruit was to be levied, they stirred up the multitude to a revolt. Their triumph was complete; palaces and public buildings

were destroyed, a bloody popular justice was executed, and the viceroy was terrified into the greatest concessions, and entered into a regular treaty with Masaniello in the church of the Carmelites on July 13. But success and the flatteries of the viceroy turned the fisherman's head; he gave himself up to drunkenness and every excess, and his capricious despotism immediately became terrible to his own associates, who assassinated him on July 16. See Angelo Saavedra, duke of Rivas, *Insurrection de Napoli en* 1647. (2 vols., Madr. 1849).

MASAY'A, one of the oldest towns of Nicaragua, Central America, close to a lake of the same name, 40 m. n.n.w. of Nicaragua city, and 8 m. from the n. shore of the lake of Nicaragua, near the volcano of Masaya—a broad, low mountain, about 3,500 ft. high, with one large and several minor craters. The last great eruption of this mountain was in 1670, when the lava spread in a northern direction to a distance of more than 20 miles. This great lava-field is said to resemble an ocean of ink suddenly congealed in a storm. In 1860 the mountain showed signs of renewed activity. The town is the center of a very fertile district, and has a pop. of 16,000, chiefly Indians, who are said to be thrifty and industrious.

MASCARA', a very old t. of Algeria, in the province of Oran, and 50 m. s.e. of the town of that name, on the slope of the Atlas mountains. Mascara was built by the Turks upon the site of a Roman colony. During the first years of the French occupation, it was a favorite residence of Abd-el-Kader, but was taken by the French in 1835. Pop. about 9,000, of whom more than a half are natives.

MASCARENE', JEAN PAUL, 1684-1760; b. at Castres, France, of a Huguenot family; educated at Geneva, and naturalized in England in 1706. Entering the army as lieut., he accompanied the British troops to Nova Scotia in 1711, and remained there nearly 50 years. He was a member of the council in 1720, and acted with the governors of Massachusetts and New Hampshire in negotiating the treaty of 1725 with the eastern Indians; was acting governor of Nova Scotia from 1740 to 1749; took part in the defense of the province against the French in 1744, and became maj.gen. in 1758. Died in Boston.

MASCARENE' ISLES, or MASCARENHAS, the collective name given to islands of Bourbon (q.v.), and of Isle-de-France or Mauritius (q.v.). The island of Rodriguez, 360 m. further e., is sometimes reckoned as one of them.

MAS'CLE (from *macula*, the mesh of a net), in heraldry, a lozenge-shaped figure perforated and showing a narrow border. The term *mascally* is applied to a field divided by diagonal lines into lozenge-shaped compartments of alternate tinctures, each having its center voided of the opposite tincture. *Lozengy-mascally* is a field composed of lozenges and mascles alternately. In the earlier heraldry, mascally was used for what was afterwards called lozengy. Crosses and other ordinaries may be formed of mascles, in which case they should begin with half a mascle.

MASCOU'TINS, an Indian tribe of the Algonquin family, very well known in the 17th c., and appearing constantly in the history of the early French settlers. Their habitat was the country about the northern lakes, and they were found on the Wisconsin and Fox rivers about 1669, and later on in the vicinity of the Ohio, in what is now Indiana. They appear to have been on friendly terms with the Kickapoos, Foxes, and Miamis, but quarreled with the Ottawas. In 1765 they attacked a party under the English col. Croghan on the Wabash river, and in 1777 endeavored to perform an act of treachery affecting col. Clarke, an American officer operating in their country. As early as 1712 they had united with the Kickapoos and Foxes against the French. Indeed, this tribe appears to have antagonized the whites from the time of the first settlement, inciting other tribes to join them in their warfare. By the Hurons the Mascoutins were called, in their own language, Asistaeronon, the "fire-nation;" but the name Mascoutin is said to mean prairie. Since the last century the Mascoutins have died out as a separate organization, and are not now known to the U. S. government as a tribe. It is, however, probable that they are still represented on some of the reservations.

MÂS-ĒNÂ, a t. of Negroland, Africa, capital of the country of Bagirmi, in lat. 11° 35′ n., long. 16° e., about 100 m. s.e. of lake Tchad. It covers an area 7 m. in circumference, and was formerly much larger. Its present reduced condition has been induced by disastrous civil and foreign wars. Only about half the area of the town is inhabited. The palace of the sultan, who is reported to have from 300 to 400 wives, consists of irregular clusters of clay buildings, and huts surrounded by a wall built of baked bricks. The town is walled, and has 9 gates. It has on the whole a dilapidated appearance.—Barth's *Travels in Central Africa.*

MASÈRES, or MAZÈRES, FRANCIS, an English mathematician, commonly called baron Masères; 1731–1824; b. London. His father was a physician, driven from France by the revocation of the edict of Nantes. The son was educated at Clare-Hall, Cambridge, taking the highest rank in the classics and mathematics. Having obtained a fellowship in the college, he removed to the Temple; was in due time admitted to the bar; was appointed attorney-general for Canada, and resided in Quebec till 1773. Returning to England he was appointed to the office of cursitor baron of the exchequer, which office he held till his death. He was also at different times deputy recorder of

London and senior judge of the sheriff's court. He published *Elements of Plane Trigonometry; Principles of the Doctrine of Life Annuities; Scriptores Logarithmici*, a collection, in 6 vols. quarto, of writings on the subject of logarithms, the works of Kepler, Napier, Snell, etc., being interspersed with original tracts on kindred subjects; *Scriptores Optici*, a reprint of the optical writings of James Gregory Descartes, Shooten, Huygens, Halley, and Barrow. He reprinted also a large number of tracts on English history. The expense of Hales's treatise on *Fluxions* was defrayed by him.

MASHAM, ABIGAIL, Lady, 1670–1734; b. London; daughter of a merchant named Francis Hill and Miss Jennings, an aunt of the duchess of Marlborough. Her father lost his fortune by speculation, and Abigail became waiting-woman to Lady Rivers. Soon after by the influence of the duchess of Marlborough, she was appointed a lady of the bedchamber to princess Anne. She became the confidant of the princess, and, after the latter became queen, did all she could to destroy the Marlborough influence at court. In 1707, Abigail was married, by consent of the queen, to Samuel Masham, a gentleman of the bedchamber to prince George of Denmark. This marriage brought about an open rupture with the Marlboroughs. The intrigues of Mrs. Masham finally resulted in the overthrow of the whigs, the elevation of Harley to power, and the dismissal of the duke of Marlborough. The high-church principles of Mrs. Masham recommended her from the first to Anne, who had been compelled to accept a whig government, but whose political sympathies lay with the tories. Mrs. Masham was engaged in plots to bring back the Stuarts; and she seems always to have used her position for her pecuniary advantage. Her husband was raised to the peerage in 1711. Lady Masham adhered to Bolingbroke in the quarrel between him and Oxford. After the death of queen Anne in 1714 she lived in retirement.

MASHE'NA, a t. of Bornu, central Africa, in lat. 13° 3′ n., long. 10° 2′ e., about 240 m. w. of lake Tchad. It lies on the gentle southern slope of an eminence, the top of which is crowned with a rocky crest, and is surrounded with a clay wall. According to Barth, it is a considerable place for this country, having a pop. of certainly not less than 10,000, but without the least sign of industry.

MASINISSA, or MASSINISSA, King of the Massylians; B.C. 239–148; a famous African prince, son of Gala. He was educated at Carthage, and in 213 B.C. induced his father to form a league with the Carthaginians. In the same year he sailed for Spain at the head of a troop of Numidian cavalry, and displayed great zeal and valor in the war against the Romans. But the defeat of the Carthaginians at Silpia in 206 B.C., and the generosity with which his nephew, Massiva, was treated by Scipio Africanus, led him to become a faithful ally of the Romans. The crown of his country, which, after the death of his father Gala, had passed in rapid succession to his uncle Œsacles, and his cousin Capusa, was seized at this time in the name of an infant brother of the latter by Mezetulus. On hearing of this usurpation, Masinissa crossed to Africa, defeated Mezetulus in a pitched battle, and forced him to flee into the kingdom of Syphax. The Carthaginians, however, irritated at his open avowal for the Romans, incited Syphax to make war upon him. Defeated and stripped of his sovereignty, he was compelled to seek refuge near the Syrtis minor, where he bravely defended himself until the arrival of Scipio in 204 B.C. He identified his cause with that of the Romans, and his knowledge of the habits of the enemy contributed greatly to the two victories gained over Hasdrubal and Syphax. He then, after a march of 15 days, captured Cirta, the capital of Syphax. In the decisive battle of Zama which followed the arrival of Hannibal in Africa (202 B.C.), he made a brilliant charge at the head of his Numidian horse, drove the cavalry of Hannibal from the field, and was, therefore, the first to turn the tide of battle against the Carthaginians. For this service he received the greater part of the kingdom of Syphax in the following year. He now profited by the leisure which peace afforded him, devoting his attention to the organization of his government and to the civilization of his semi-barbarous subjects. But his lust of conquest was never satiated, and in his ninetieth year he marched into the territories of Carthage. Although several of his chiefs had deserted him, he adroitly circumvented the enemy, and forced them to capitulate.

MASK (Med. Latin, *masca;* Fr. *masque*), a disguise or covering of the face, the use of which, perhaps, originated in the harvest festivities of the Grecian peasantry of the most ancient times, and appears subsequently to have been associated with the representation of Satyrs, Silenus, and Bacchus in the orgies of Bacchus. Greek tragedy having originated in close connection with the worship of Bacchus, masks were employed in it from the first; but it is uncertain when they were introduced in comedy. The masks used by actors were of very various form and character. They were often provided with metallic mouthpieces, for the purpose of increasing the power of the voice, this being rendered requisite by the immense size of the ancient theaters; their whole use being indeed adapted to such vast buildings, and to a style of dramatic representation in which the ideal prevailed, and the reality of individual impersonation was far less thought of than in modern times. Much information on the subject of ancient masks may be found in the work of Pacichelli, *De Mascheris, Capillamentis et Chirothecis* (Naples, 1693); in the magnificent work of Pietro Contucci Ficoroni, *De Larvis Scenicis et Figuris Comicis* (Rome, 1754), and in Berger's *De Personis vulgò Larvis seu Mascheris* (Frankf. 1723).

The use of masks in the modern theater originated in the Italian *commedia dell' arte*, which may itself be traced back to the ancient Roman mimes and pantomimes, and has always been confined to that class of entertainments in which the very names of the characters, *Pantaloon, Harlequin*, etc., have been borrowed from Italy.

MASK, MASKED, a military expression used in several senses. A *masked battery* is one so constructed, with a grassy glacis, etc., as to be hidden from the view of the enemy, until, to his surprise, it suddenly opens fire upon him—on his flank, perhaps. The fire of a battery is *masked* when some other work, or a body of friendly troops, intervenes in the line of fire, and precludes the use of the guns. A fortress or an army is masked when a superior force of the enemy holds it in check, while some hostile evolution is being carried out.

MASK, THE MAN WITH THE IRON. See IRON MASK, *ante*.

MASKELYNE, NEVIL, an English astronomer and physicist, was b. in London, Oct. 6, 1732. He was educated at Westminster school, whence he was removed to Catherine hall, and subsequently to Trinity college, Cambridge, where he obtained a fellowship in 1756. In 1758 he was elected a fellow of the royal society, and resolved to devote himself to astronomy. In 1763 he made a voyage to Barbadoes, to test the newly invented Harrison chronometers, and, after his return, was (1765) appointed astronomer-royal. During the 46 years that he held this situation, he acquired universal respect by his diligence and the accuracy of his investigations, made several improvements in the arrangements and employment of the instruments, and was the first to mark the time to tenths of a second. In 1744–46 he made his expedition to Schehallion, for the purpose of determining the density of the earth. See EARTH. Maskelyne was the means of originating the *Nautical Almanac* (q.v.), and also obtained leave to have his observations printed at the expense of government. He published very few works out of his official capacity, but of the others, no fewer than 35 appeared, many of which have been found of immense service (especially his *Astronomical Observations*) to subsequent astronomers. Maskelyne died Feb. 9, 1811.

MASKINONGÉ, a s.w. co. of Quebec, Dominion of Canada, having lake St. Peter on the s.e; 3,221 sq.m.; pop. '71, 15,079. It is watered by the Gatineau, Du Lièvre, Maskinongé, and Du Loup rivers. The population is nearly all of French extraction or origin. Capital, Rivière du Loup.

MASKS, in architecture, are carved as decorations on keystones and other prominent positions.

MASON, a co. of central Illinois, having the Illinois river on the n. and the Sangamon on the s.; 580 sq. m.; pop. '80, 16,244. It presents a surface of low prairie land, very fertile. Intersected by division of the Chicago and Alton, the Springfield and Northwestern, and the Peoria, Pekin and Jacksonville railroads. It produces very largely of Indian corn, wheat, oats, butter, hay, and potatoes. Co. seat, Havana.

MASON, a co. in n.e. Kentucky, having the Ohio river on the n.; drained by the n. fork of the Licking river, and Limestone and Lee's creeks; 236 sq.m.; pop. '80, 20,469. The surface toward the n. is hilly, elsewhere more level, the soil being generally fertile. Productions are wheat, oats, rye, barley, Indian corn, tobacco, wool, butter, and hay. There are some thriving manufacturing industries prosecuted, including agricultural implements, woolen and cotton goods, carriages, and wagons. Co. seat, Maysville.

MASON, a co. in w. Michigan, on lake Michigan; 460 sq.m.; pop. '70, 3,263; watered by the Great and Little Sable, the Marquette, and the Notipeskago rivers. It is characterized by a generally level surface, and very fertile soil. Productions are Indian corn, wheat, oats, potatoes, and hay. Co. seat, Pere Marquette.

MASON, a co. in w. central Texas, drained by branches of the Colorado, the Llano, and the San Saba; 910 sq.m.; pop. '80, 2,655. The surface is mostly fertile land, but a considerable portion of it is heavily wooded. Stock raising is the principal industry. Productions are Indian corn, hay, sweet potatoes, wool, and butter. Co. seat, Mason.

MASON, a co. in w. part of Washington territory, bounded on the e. by Puget sound; 1600 sq.m.; pop. '80, 639. It is crossed by the Olympus and Coast mountains, which are separated by broad valleys of very fertile land. The principal industry is lumbering, the farm products—oats, hay, and potatoes,—being unimportant. The sound makes up into the land at many points, forming inlets which are excellent harbors. Co. seat, Oakland.

MASON, a co. in the w. part of West Virginia, having the Ohio river on the n. and w., and intersected by the Great Kanawha river and its affluents; 300 sq.m.; pop. '80, 22,293. The surface varies in character, the soil being generally fertile. There are iron ore, coal, and salt springs. The productions are Indian corn, wheat, oats, potatoes, tobacco, wool, and hay. Co. seat, Point Pleasant.

MASON, ARMISTEAD THOMSON, 1787–1819; b. Va.; son of Stevens. He graduated at William and Mary college, and became a farmer. He served through the war of 1812 as col. of a cavalry regiment, distinguishing himself at the defense of Norfolk; and he was afterward made a brig.gen. in the Virginia militia. He was elected to the Virginia house of representatives and to the U. S. senate, from which he resigned in 1817

to become a candidate for the lower house of congress, hoping by means of his unbounded personal popularity to defeat the federalist candidate, Mercer. The election was bitterly contested; but Mercer was returned by a narrow majority. The campaign gave rise to a number of heated controversies and several duels; and Mason himself was killed in a duel by his own cousin, col. John Mason McCarty.

MASON, CHARLES, 1730–87; b. England, and long employed as an assistant at the Greenwich observatory; was sent with Jeremiah Dixon to the cape of Good Hope in 1761 to observe the transit of Venus. In 1763 the same gentlemen were employed by the proprietors of Maryland and Pennsylvania to survey the boundary line between their respective possessions; a task upon which they were engaged until Dec. 26, 1767. The boundary fixed by them has since been known as "Mason and Dixon's line" (q.v.). They also, at the request of the Royal society, fixed "the precise measure of a degree of latitude in America," for which service the society granted them £200. The particulars of this work are recorded in vol. lviii. of the society's *Transactions*. In the same volume may be found *Astronomical Observations made at the Forks of the Brandywine* for the purpose of "determining the going of a clock sent thither by the Royal society in order to find the difference of gravity between the observatory at Greenwich and the spot where the clock was set up in Pennsylvania." Mr. Mason recorded in his private journal a minute account of his proceedings in America, his haps and mishaps, as well as of his scientific observations on a great variety of subjects, with interesting notices of the Indians of various tribes whom he met on his route or who rendered assistance to him and his companions. He describes with enthusiasm the beauty and grandeur of American scenery, and gives a tolerably accurate account of the valley of the Mississippi, as received by him from an aged Indian chief. Mason and Dixon returned to England in the autumn of 1768. In the following year Mason went to Cavan, Ireland, to observe the transit of Venus, his report of which appeared in the *Philosophical Transactions* for 1770. He was also employed by the bureau of longitudes to verify the lunar tables of Tobias Mayer, in which he made some corrections. At an unknown date he returned to America, and died in Philadelphia in 1787. His private journal, field notes, etc., were found among a pile of waste paper in the cellar of the government-house at Halifax, Nova Scotia, in 1860, and an account of their contents was published by Porter C. Bliss in the *Historical Magazine* for July, 1861.

MASON, EBENEZER PORTER, 1819–40; b. Washington, Conn.; graduated at Yale in 1839. He was distinguished for his early proficiency in mathematical and astronomical studies, and shortly after his graduation was appointed a member of the commission for defining the boundary between Maine and Canada. Not long after this he published *Observations on Nebulæ*, a paper which was highly commended by Sir John Herschel. D. at Richmond, Va., a few days after attaining the age of 21 years. His *Life and Writings* were published by prof. Denison Olmsted.

MASON, ERSKINE, D.D., 1805–51; the youngest child of Dr. John Mitchell Mason; b. New York; graduated at Dickinson college, Carlisle, Penn., of which his father was then president; studied theology at Princeton seminary; was pastor of the Presbyterian church at Schenectady, N.Y., 1827–30; and of the Bleecker street church, New York city, 1830–51. He was stated clerk of the general assembly of the Presbyterian church, N.S., 1838–43; and acting professor of church history in the Union theological seminary, New York city. He ranked very high as an argumentative preacher, and drew many eminent men, both citizens and strangers, to listen to his eloquent appeals. A selection from his sermons, with a short memorial notice by his friend Dr. William Adams, was published soon after his death in a volume entitled *A Pastor's Legacy*.

MASON, FRANCIS, D.D., 1799–1874; b. York, Eng.; left the parish school to work at the trade of his father who was a shoemaker. While thus employed he happened to find a work on geography and astronomy, which led him to attend an evening-school where he learned algebra, geometry, and trigonometry. In 1818 he came to the United States and worked at his trade at various places at the West. In 1824 he went to Boston, and worked at Randolph and Canton, Mass. At Canton he married, joined the Baptist church, and studied languages with his pastor. In 1827 he studied at Newton theological seminary, and in 1830 was sent as a missionary to Burmah. His labors were chiefly among the Karens, among whom he had great success. In two dialects of their language he translated the Bible and other religious books, and conducted a seminary for the training of preachers and teachers. He published in 1852 a work on the natural productions of Burmah, pronounced by Dr. Hooker "the most valuable addition to the history of the fauna and flora of British Burmah." A second edition was published under the title of *Burmah: its People and Natural Productions*. He published also a grammar, chrestomathy, and vocabulary of the Pali, besides translations from the Burman, Pali, and Sanskrit; *Life of Ko-Thah-Byu, the Karen Apostle; A Memoir of Mrs. Helen M. Mason;* a *Memoir of San Quala, a Karen Convert; The Story of a Working-man's Life, with Sketches of Travel.*

MASON, GEORGE, a member of the English parliament in the reign of Charles I. He opposed the arbitrary policy of the king towards the colonies, but disapproved of extreme measures against him. He was an officer in the army of Charles II., and when

defeated at Worcester in 1651, he escaped in disguise to Virginia, losing all his possessions in England.

MASON, GEORGE, 1726–92; b. at Doeg's Neck, Fairfax co., Va.; a descendant of col. George Mason who was a member of the English parliament in the reign of Charles I.; settled in Truro parish; built Gunstan hall on the Potomac, and became the intimate friend of Washington, for whom he drafted the "non-importation resolutions," which were offered by Washington, and adopted by the Virginia assembly in 1769. One of these was that the Virginia planters should purchase no slaves imported after Nov. 1. of that year. At a meeting of the people of Fairfax, July 18, 1774, he offered 24 resolutions on questions at issue between Great Britian and the colonies, which were sanctioned by the Virginia convention in August, and reaffirmed by the continental congress in October of the same year. In 1775 he was a member of the Virginia convention. In May, 1776, he drafted the declaration of rights and the plan of government, which were adopted by a unanimous vote. He was a member of the continental convention in 1777, and of the constitutional convention in 1787, taking decided ground against all measures tending to perpetuate slavery. He disapproved of the proposed instrument and refused to sign it, declaring that it would "result in a monarchy or a tyrannical aristocracy." He was a member of the convention called to consider the federal constitution, and with Patrick Henry, opposed it, insisting on 20 alterations. Some of these were afterwards adopted by congress and the states. He was elected the first United States senator from Virginia, but declined. His statue stands with those of Washington, Jefferson, Henry, and other distinguished Virginians in front of the state capitol at Richmond.

MASON, JAMES MURRAY, 1798–1871, b. Va.; a grandson of George. He began the practice of law at Winchester, in 1820; and six years later took his seat in the Virginia legislature, to which he was twice re-elected. In 1837 he was elected to congress, but at the end of his term, he refused a re-nomination, and resumed the practice of his profession. In 1847 he was appointed to fill a vacancy in the U. S. senate, to which he was elected in 1849, and again in 1855. He occupied a conspicuous position in the senate, where he was for a number of years, chairman of the committee on foreign affairs. Among the important measures with which he was connected, may be mentioned the fugitive slave law of 1850, which was drawn up by him. He was an ardent secessionist, and was expelled from the senate in 1861. He was soon appointed a commissioner for the confederate states to England and France, and on Nov. 8, 1861, with his fellow commissioner John Slidell, was taken off the British mail steamer, *Trent*, by captain Charles Wilkes. He was imprisoned in fort Warren, Boston, till Jan. 2, 1862, when he was surrendered to the English government. During the remainder of the war, he lived for the most part in Paris, still representing the confederate government. At the close of the war, he came to Canada, and after spending three years there, went to Virginia.

MASON, JEREMIAH, LL.D., 1768–1848, b. Conn., son of Jeremiah Mason, a col. in the revolutionary war. He graduated at Yale, in 1788, and was called to the bar in 1791. He began the practice of his profession at Westmoreland, N. H., near Walpole, whither he removed in 1794. Three years later, he removed to Portsmouth, which was his home for the next 35 years. He was soon recognized as the head of his profession, in a state whose bar was then, and perhaps since, unequaled in this country, and which could number among its members Ezekiel and Daniel Webster, and Jeremiah Smith. He held the office of attorney general for the state in 1802, and was elected to the U. S. senate, in 1813. He became one of the foremost debaters in that body, his speech delivered in 1814, on the embargo, being especially powerful. But he was, before everything else, a great lawyer, and he soon tired of politics, and in 1817, resigned his seat in the senate, and resumed the practice of his profession. He afterwards served, for a number of terms in the New Hampshire legislature, where his service had little connection with politics, but was given largely to revising and codifying the state laws. It was he who framed for the legislature its report on the Virginia resolutions with regard to the repeal of the Missouri compromise, and the state enjoyed in many other directions the benefit of his legal learning and sagacity. But he felt the need of a larger field for the display of his talents, and in 1832, removed to Boston, where the Websters had long preceded him. He was employed in Boston upon many great cases, and maintained till his age compelled him to retire, the high reputation which he had won elsewhere. His was one of the most acute legal minds in America. He was a greater lawyer than Webster, however inferior to him in other respects; and Webster, who had abundant occasion to conceive a respect for Mason's abilities, while they were both engaged in the trial of causes at the New Hampshire bar, does not exaggerate in giving his estimate of Mason: "Of my own professional discipline and attainments, whatever they may be, I owe much to that close attention to the discharge of my duties, which I was compelled to pay for 9 successive years, from day to day, by Mr. Mason's efforts and arguments at the same bar." "The characteristics of his mind," he adds, "as I think, were real greatness, strength, and sagacity. He was great through sound sense and sound judgment."

MASON, JOHN, d. 1635; b. at Lynn Regis, Norfolk, England, and served in 1610 in the navy; in 1616 went to Newfoundland as governor of the colony, and in 1620 pub-

lished a description of the country, to which he added a map in 1626. He explored the New England coasts in 1617; in 1622 obtained a grant of a region called Mariana, now the n.e. part of Massachusetts; in the same year, in connection with sir Ferdinand Gorges, procured a patent for the province of Maine; and in 1623 sent a colony to the Piscataqua river. In 1624–29 he was treasurer and paymaster of the English armies in the Spanish war. In 1629 he obtained a patent for the New Hampshire colony, and with Gorges took one also for Laconia, a region including lake Champlain. He held various honorable positions in England, in 1635 being a judge in Hampshire and vice-admiral of New England. His rights in New Hampshire were sold in 1691 to governor Samuel Allen. Died in London in Dec., 1635.

MASON, JOHN, 1600–72, b. England; served under sir Thomas Fairfax in the Netherlands; emigrated in 1630 to Dorchester, Mass.; removed in 1635 to Connecticut, and aided in founding Windsor. A party of whites having been massacred by the Pequot Indians at Wethersfield in 1637, he was appointed by the general court to attack the Pequots at the mouth of the Pequot river. With a force of 90 English and 70 friendly Mohegans under Uncas, he landed, May 23, in Narragansett bay, near point Judith. Aided by 200 Narragansetts under Miantonomah he marched to the two principal forts of the Pequots near the Mystic river. Though nearly deserted by his frightened allies, he attacked the nearest fort, May 26, 1637, but, unable to dislodge the Indians, he set fire to their wigwams, the whites and their allies surrounding the forts to prevent escape. Between 600 and 700 Pequots perished, seven were captured, and seven escaped; two of the English were killed and twenty wounded. He then pursued the remnant of the Pequots toward New York, killed and captured many, distributing those that remained among the Mohegans and Narragansetts. The peace now secured with the Indians continued for 40 years. After the Pequot war Mason removed to Saybrook, at the request of the inhabitants, for the defense of the colony, and in 1659 removed to Norwich. He was a maj. of the colonial forces for 30 years, deputy-governor of Connecticut 1660–70, and a magistrate 1642–68. He prepared, at the request of the general court of Connecticut, an account of the Pequot war, which was reprinted by Increase Mather in 1677.

MASON, JOHN MITCHELL, D.D., 1770–1829; b. New York; graduated at Columbia college, 1789, and continued his studies at the university of Edinburgh; after his father's death in 1792 succeeded him as pastor of the Associate Reformed church (Presbyterian); in 1804 became professor of theology in a seminary of which he was one of the founders. In 1811 the trustees of Columbia college, in order to enjoy the benefit of his eminent talents, created for him the office of provost, which he filled until 1816, taking charge of the senior class, and giving new life to the lecture-room; from 1821 to 1824 he was president of Dickinson college at Carlisle, Penn., and during that time connected himself with the Presbyterian church. As a pulpit orator he had great power and fervor; his eloquence is one of the traditions of the city of New York. When Robert Hall heard him deliver his celebrated discourse on "Messiah's Throne," he is said to have exclaimed, "I can never preach again." His aspect was on a scale of grandeur corresponding to the majesty of the mind within. Tall, robust, straight, with a head modeled after neither Grecian nor Roman standards, yet combining the dignity of the one and the grace of the other; with an eye that shot fire, especially when under the excitement of earnest preaching, yet tender and tearful when the pathetic chord was touched; with a forehead broad and high, and a mouth expressive of decision, Dr. Mason stood before his audience a prince of pulpit orators.

MASON, JOHN Y., LL.D., 1799–1859; b. Va.; educated at the university of North Carolina, and admitted to the bar. After serving for a number of terms in the Virginia assembly, he entered congress in 1831, and remained till 1837, when he was appointed judge of the U. S. district court for Virginia. He continued to hold that office till 1844, when president Tyler made him secretary of the navy. He entered the cabinet of president Polk as attorney-general, but was transferred in 1846 to the department of state. In 1854 president Pierce made him minister to France, where he remained till his death.

MASON, LOWELL, 1792–1872; b. Mass.; commenced his musical career in Savannah, where he was appointed choir leader in 1812. In 1821 he published a volume entitled *Handel and Haydn Collection of Church Music*, which attracted considerable attention. He removed to Boston in 1827, and devoted himself to the instruction of classes in vocal music; introducing musical instruction into the public schools of Massachusetts; and securing the establishment of the Boston academy of music. He made numerous compilations of glee-books, text-books, collections for family and Sunday use, etc. In 1837 Dr. Mason visited Europe, to make himself thoroughly familiar with the continental methods of musical instruction. In 1855 he was made doctor of music by the university of New York, the first degree of that character conferred in America. His chief claim to distinction rests on his efforts to make vocal music popular among the masses and on his hymn tunes, several of which are in constant use by all denominations in the United States, and have in some instances been given by the severer musical criticism of the present day a rank scarcely less high than that accorded them by continuous popular favor.

MASON, RICHARD B., d. 1850; b. Va.; a grandson of George. He entered the army as a lieut. in 1817, was promoted to a captaincy in 1819, and served through the Black

Hawk war in the dragoons. He was made a col. in 1846 and was at the head of the American troops in California, of which he was for a time military and acting civil governor. In recognition of his services in the Mexican war, he was brevetted brig.gen., May 30, 1848.

MASON, STEVENS THOMSON, 1760–1803; b. Va.; a son of Thomson. He was educated at William and Mary college, but entered the American army, in which, while hardly 20 years of age, he held the rank of col.; and he was a gen. at its close. He served for a number of years in the Virginia house of delegates, and was a conspicuous member of the constitutional convention of 1788. From 1794 till his death, he was a member of the U. S. senate.

MASON, STEVENS THOMSON, 1811–43; b. Va.; grandson of Stevens Thomson. He received his education in Kentucky, where his father, gen. John T. Mason, had settled. In 1831 he was appointed secretary of the territory of Michigan, which had just been organized; and when its governor, Lewis Cass, entered Jackson's cabinet as secretary of war, Mason became acting governor of the territory. He continued to serve in this capacity during the dispute in regard to the proper boundary between Ohio and Michigan; and the final peaceful settlement of the controversy was, in no small degree, rendered possible by his tact and moderation. As soon as Michigan was erected into a state in 1835, Mason was unanimously chosen governor; and he was honored with a re-election, retiring in 1839. The last three years of his life were spent in New York, where he had begun to practice law.

MASON, THOMSON, 1730–85; b. Va.; a brother of George. He read law in the temple, London, after which he returned to Virginia, and made his home in Loudon county. He took a conspicuous part in the revolutionary movement in Virginia, and in 1774 published a series of papers, advocating resistance to the claims of England. In 1778 he was appointed to a seat upon the state supreme court, then just established, and soon after he served upon the commission to codify and revise the state laws. In 1779 and again in 1783, he was chosen a member of the state legislature.

MASON, WILLIAM, an English divine and poet; 1725–97; educated at Cambridge, and admitted fellow of Pembroke college in 1747; became rector of Aston in Yorkshire, and chaplain to the king; subsequently was for 32 years precentor and canon residentiary of the cathedral of York. He published a *monody* to the memory of Pope; *Isis*, an elegy; the dramatic poems of *Elfrida* and *Caractacus*. In 1756 he published a small collection of odes as an imitation of Gray. In 1763 he produced some fine elegies. He is considered in point of morality as the purest of poets, and one of the warmest friends of civil liberty. In 1772 was published the first book of a descriptive poem entitled *The English Garden;* and the remainder in 1781. In 1775 he published the poems of Gray, with a memoir of his life and writings prefixed; in 1783 an elegant translation of Dufresnoy's Latin poem on the art of printing, and *An Historical and Critical Essay on English Church Music.* In addition to his poetical reputation, he was skilled in painting and music. A tablet to his memory is placed in the poets' corner in Westminster abbey. A complete edition of his poems was published in York in 1771.

MASON, WILLIAM, b. Mass., 1829, son of Dr. Lowell Mason. He studied music in Europe with Hauptmann, Moscheles, and Liszt, and returned to America in 1854, after having appeared as a piano performer at Prague, Frankfort, Weimar, and London. His first concert in this country was given at Boston, which was followed by several very successful concert tours. He then settled in New York, devoting himself to teaching and composing. From 1855 to 1868 he played the piano in connection with the well-known string quartet composed of Theodore Thomas, Joseph Mosenthal, George Matska, and Carl Bergmann. In 1872 he received from Yale college the degree of doctor of music. He has held several prominent positions as organist, and many of his compositions have been republished in Europe.

MASON AND DIXON'S LINE, a line running along the parallel of lat. 39° 43′ 26.3″, and separating Pennsylvania from Maryland, drawn by two distinguished English astronomers and mathematicians, Charles Mason and Jeremiah Dixon. For about 80 years after 1681, there were constant dissensions between the lords Baltimore and the Penn family, the rival proprietors in Pennsylvania and Maryland, in regard to the position of the boundary-line between their colonial possessions. An agreement was come to in 1760, in accordance with which a party of surveyors commenced to make out the real boundary. The proprietors in London, not understanding the length of time required for such an undertaking, and growing impatient, sent out Mason and Dixon to complete the surveys, who commenced the work in Dec., 1763. They concluded their task towards the end of 1767, having marked out a line of 244 m. in length, passing through forests, over mountain ridges, etc. At the end of every fifth mile a stone was planted, on which was engraved on one side the arms of lord Baltimore, on the other those of the Penns. The intermediate miles were marked by smaller stones with an M on one side and a P on the other. All the stones came from England. The surveys were revised in 1849, and found substantially correct.

This line must be distinguished from that of 36° 30′, which separated the free and slave states of the original confederation. The latter is also the *compromise line,* which

in 1820 was fixed as the most northern limit of such slave states as should be admitted into the union.

MASON AND DIXON'S LINE (*ante*) originated in the difficulties which occurred in tracing the boundary line of a tract of land granted to William Penn in 1681. This land lay w. of the Delaware and n. of Maryland, and a part of its southern boundary was defined to be "a circle drawn at 12 m. distant from Newcastle northwards and westwards into the beginning of the 40° of northern latitude." Later, Penn received another grant, and, his agent being unable to agree with the authorities in America as to the just boundary, he came to this country himself in 1682 to establish his claim and take possession of his land. He was opposed by lord Baltimore, the matter was referred to the committee of trade and plantations, a change in the reigning monarch of England took place, and it was not until 1760 that the final deed was issued to the heirs of Penn, closing the controversy. But even then the question of surveying the disputed territory with a view of defining the boundary-line opened new disagreement; and it was to arrange this that Charles Mason and James Dixon, "mathematicians and surveyors," were mutually agreed upon by the contestants, Thomas and Richard Penn, on the one part, and lord Baltimore, the great-grandson of Cecilius, the first patentee, on the other, "to mark, run out, settle, fix, and determine all such parts of the circle, marks, lines, and boundaries as were mentioned in the several articles or commissions, and were not completed." The two surveyors commenced their work in 1764, and did not finish it until 1767; the delay being partly owing to Indian troubles, involving negotiations with the Six Nations in their settlement. The line, as finally drawn, has been popularly supposed to have been the dividing line between the free and the slave states; but this is an error, as slavery existed throughout Delaware, which is both e. and n. of the line, until abolished by the 14th amendment to the constitution. To this line is owing the peculiar tract of land known as the "pan-handle," where a part of Virginia runs up between Pennsylvania and the Ohio river.—Very little is known of the two "surveyors of London," as they were styled. Mason was an assistant of Dr. Bradley at the royal observatory at Greenwich; both were members of the American philosophical society; both were sent by the royal society to the cape of Good Hope to observe the transit of Venus in 1769. Dixon died in Durham, England, in 1777; and Mason died in Pennsylvania in 1787.

MASON BEE, a name given to those species of bee which build their nests of agglutinated earth or grains of sand. See BEE. *Megachile muraria* is a British species, black, the wings tinted with violet. The nest is attached to walls or stones in sunny places. The interior contains about a dozen cells, in each of which is deposited an egg, with a piece of paste for the food of the larva. These bees sometimes repair old nests, and have fierce combats for the possession of them.

MASONED, in heraldry, a term used to describe the lines formed by the junction of the stones in building.

MA'SONRY, the art of construction in stone. The earliest existing examples are among the most magnificent specimens of the art. No nation has excelled the ancient Egyptians in stonework, whether we consider the size of the materials, or the unequaled exactness with which they are fitted together. The Egyptians did not use mortar in their important structures, such as the pyramids, the joints being all carefully polished and fitted. Cyclopean masonry, of which remains exist in many parts of Greece and Italy, also exhibits stones of great size and with carefully-adjusted joints. The walls of Mycenæ are among the earliest examples. These are built with huge irregular blocks, the spaces between being filled up with smaller stones. The Etruscan specimens are more carefully executed; the stones are not squared, but they are all carefully fitted together. In some cases, the beds or horizontal joints are made level, and the upright joints left unsquared. No mortar is used in cyclopean masonry.

The masonry of the Greeks and Romans very closely resembled that of the present day: *Rubble-work* (*opus incertum*), in which the stones are not regularly coursed; *coursed-work*, where the joints are all level, and the stones of equal height; *ashlar*, resembling the latter, but built with larger stones all carefully dressed on the joints. Many of the Roman buildings in the eastern empire were constructed with blocks of enormous size, as at Baalbec, where some of the stones are 60 ft. in length. Ashlar-work is frequently used for the exterior surface of walls, the inside being "backed up" with rubble-work. This kind of work is sufficient for ordinary purposes; but where great strength is required, the whole thickness must be built with solid blocks. Ashlar-work is generally bedded in fine mortar, with one inch of oil-putty on the outer edge.

The early mediæval masonry was of very bad construction, being, in fact, little better than common rubble, with an occasional use of herring-bone work. The Normans improved upon this kind of work, but their masonry was also so bad that most of the towers built by them either fell or had to be taken down. The fall of the tower of Chichester cathedral, a few years ago, was occasioned by defective Norman masonry. The art gradually improved with the advance of Gothic architecture, and ashlar was reintroduced for all important works. The ashlar-work so constantly used in renaissance buildings, has lately given place to a more picturesque style of masonary called hammer-dressed and squared work—the money saved upon this cheaper work being

applied with good effect in improving the appearance of the doors, windows, and other prominent features of the buildings.

There is one very simple rule, too little attended to in modern masonry—viz., that all stones, at least when stratified, should be laid on their *natural bed*, for if set on edge, they are sure to scale off and decay under the influence of the weather.

Special materials sometimes produce special kinds of work; thus, in Norfolk and Suffolk, where large flints abound, the walls are often faced with these, split so as to form a clean face and good joints, and arranged in bands or panels between stonework or brickwork. In Aberdeenshire, where granite is the usual building material, ashlar-work is almost universal, large blocks being more easily obtained and dressed than smaller ones. Again, where rag-stone only can be got, it is frequently neatly used in a similar manner to the flint above described.

MASONS, FREE. The mason brotherhoods of the middle ages were organized incorporations, not substantially different in their nature from the other guilds, governed by rules of their own, and recruited from a body of apprentices who had undergone a period of probationary servitude. Fable and imagination have traced back the origin of free-masonry to the old Roman empire, the Pharaohs, the temple of Solomon, or even the times of the tower of Babel and of the ark of Noah. The masonic craft in reality sprang into being about the same time, and from the same set of causes, as other incorporated crafts; but a variety of circumstances combined to give it an importance and influence beyond the rest. Men skilled in the hewing and setting of stones were naturally prized in an eminently church-building age. Their vocation necessarily involved traveling from place to place in search of employment. Wherever a great church or cathedral was built, the local masons had to be reinforced by a large accession of craftsmen from other parts; and the masons from neighboring towns and districts flocked to the spot, and took part in the work, living in a camp of huts reared beside the building on which they were engaged, A master presided over the whole, and every tenth man was a warden having surveillance of the rest. A mason, therefore, after going through his apprenticeship and probations, could not settle down, like another craftsman, among his neighbors and acquaintances, but must travel from place to place to find employment; hence it became desirable or necessary to devise means by which a person once a member of the fraternity might be universally accepted as such, without requiring, wherever he went, to give fresh evidence of his skill, or having to undergo a renewed examination on his qualifications. In order to accomplish this end, and to enable a mason traveling to his work to claim the hospitality of his brother-masons on his way, a system of symbols was devised, in which every mason was initiated, and which he was bound to keep secret. This symbolism, invented for the convenience of intercourse between members of the same craft, is the sole shadow of foundation for the popular notion that the masonic brethren were in possession of secrets of vital importance, the knowledge of which had been from generation to generation confined to their own order. It has been supposed that the possession of the masonic secrets enabled the masons to design the great cathedrals of the 13th and 14th centuries, whereas it is now certain that during the purest ages of Gothic architecture, both in France and in England, the architects were not members of the masonic fraternity at all, but either laymen of skill and taste, uninitiated in the mysteries of mason-craft, or oftener bishops and abbots, The masons who worked from the architect's design were, at the same time, not the mere human machines that modern workmen too generally are, but men who, in carrying out an idea imparted to them, could stamp an individuality of their own on every stone. Architecture was then a progressive art, and the architect of every great church or cathedral had made himself acquainted with the works of his predecessors, and profited by experience, adopting their beauties, and shunning their defects. The nature of the advance which architecture was then making, has been compared by Mr. Fergusson to the advance with which we are familiar in the present day in ship-building and other useful arts. "Neither to the masons nor to their employers, nor to the abbé Suger, Maurice de Sully, Robert de Susarches, nor Fulbert de Chartres, is the whole merit to be ascribed, but to all classes of the French community carrying on steadily a combined movement towards a well-defined end." In Germany, however, the masons of the 14th c., who had attained a wonderful skill in carving and in constructing arches, overstepping their original functions, took to a great extent the office of architect into their own hands; and it is undeniable that the churches designed by German masons, though rich in the most exquisite workmanship, are not comparable, in the higher elements of beauty, to the works of non-masonic architects.

The epithet "free" was applied to the craft of masons in consequence of their being exempted by several papal bulls from the laws which regulated common laborers, and exonerated from various burdens thrown on the working-classes at large both in England and on the continent. Like all the other guilds, the masons were bound by their rules to the performance of specific religious duties; but a craft one of whose principal functions was church-building, was naturally under the more especial protection of the clergy. Yet a considerable time before the reformation, we find the jealousy of the church excited from time to time by the masonic brethren, partly in consequence of their assuming other functions besides those of mere builders. In England, an act, passed in the minority of Henry VI., at the instigation of Henry of Beaufort, cardinal of Winchester,

prohibited the masons from holding their wonted chapters and assemblies. But this act was never enforced; and Henry VI., on coming of age, himself countenanced the masons, and was a member of the fraternity. Henry VII. became their grand master in England.

The history of freemasonry has been overlaid with fiction and absurdity, partly from an exaggerated estimate of its importance in the development of architecture, and partly from a wish to connect mediæval masonry with the institution that passes under the same name in the present day. Modern (or so called "speculative") freemasonry is an innocent mystification unconnected either with the building craft or with architecture. It is of British origin, and dates from the 17th century. According to the peculiar phraseology of the masonic brethren, it is founded in the "practice of moral and social virtue;" its distinguishing characteristic is charity, in its most extended sense; and brotherly love, relief, and truth are inculcated by its precepts. Its real founders were Elias Ashmole and some of his literary friends, who amused themselves by devising a set of symbols, borrowed in part from the knights templar, between whom and the old masons an intimate relation is said to have subsisted, and in part from the Rosicrucians (q. v.). These symbols, which have since been adopted as the distinguishing badge of the brotherhood of "free and accepted masons," include the sun, the moon, the compasses, square, and triangle. A number of so-called degrees or grades of masonry with fantastic names were established and conferred on the members.* Charles II. and William III. were masons; and the appearance of a connection with operative masonry was kept up by the appointment of sir Christopher Wren to the office of grand master. The "lodges" of Scotland profess to trace their origin to the foreign masons who came to Scotland in 1150 to build Kilwinning abbey; those of England go still further back, to an assemblage of masons held by St. Alban, the proto-martyr, at York in 926; and the mother-lodges of York and Kilwinning were, with insignificant exceptions, the parents of all the several lodges erected in different parts of Great Britain. Toward the close of last century, it was in some quarters made a charge against freemasonry, that under its symbolism was concealed a dangerous conspiracy against all government and religion. The accusation was probably groundless enough as regards British freemasonry, and so little effect was produced by it, that, in an act passed in 1799 for the suppression of secret societies, an exception was made in favor of freemasons. On the continent, political intriguers may sometimes have availed themselves of the secrecy afforded by freemasonry to further their schemes. In 1717 a grand lodge was formed in London, with power to grant charters to other lodges. Under its sanction, the first edition of the constitutions of the fraternity was published. The grand lodge was for a length of time on an unfriendly footing with the lodge of York, in consequence of having introduced various innovations not approved of by the older lodge, and of having granted charters within the district which York claimed as its own. In 1742 the duke of Cumberland was elected grand master of the grand lodge; and on his death, George IV., then prince of Wales, succeeded to the office, which he continued to hold till he was appointed regent, when, it being considered unsuitable that he should longer exercise any personal superintendence, he took the title of grand patron. In 1813 an understanding and a union was brought about between the two rival lodges by their respective grand masters, the dukes of Kent and Sussex. The fraternity has since been managed by the "united grand lodge of ancient free and accepted masons of England," consisting of the grand master, with his deputy, grand wardens, and other officers, the provincial grand masters, and the masters and wardens of all regular lodges, with a certain number of stewards annually elected, who meet four times a year for the dispatch of business, besides which there is an annual masonic festival, at which every mason is entitled to attend. The grand lodge of England has at present above a thousand lodges under its protection, and has H.R.H. the prince of Wales as its grand master.

In Scotland the masons, when they were a real company of artificers, were, like other handicrafts, governed by wardens of districts appointed by the king. In 1598 a re-organization of the mason lodges was effected under William Schaw, principal warden and chief master of masons, who in the following year confirmed the three "heid lodges" in their ancient order of priority—Edinburgh first, Kilwinning second, and Stirling third. In 1736 the operative element in mason lodges having become absorbed in speculative masonry, the grand lodge of Scotland was instituted by the representatives of 34 lodges, by whom also William St. Clair of Roslin was elected grand master, on account of his ancestors' alleged ancient connection with the mason craft, as patrons and protectors. Priority was assigned to the lodges according to the antiquity of their written records. The lodge of Edinburgh (Mary's chapel) was placed first, and Kilwinning second. The lodge of Kilwinning did not formally object to this till 1744, when it withdrew from the grand lodge and resumed its independence. On relinquishing this position in 1807, it was re-admitted into the grand lodge by the title of Mother Kilwinning, with precedence over the other lodges, and the provincial grand mastership of Ayrshire rendered hereditary in its master. For the foregoing information, we are

* The three principal grades are apprentice, fellow-craft, and master-mason; there being peculiar ceremonies at the making of each; and it is only on attaining to the degree of master-mason that a brother enjoys the full benefits and privileges of the craft.

indebted to Lyon's *Freemasonry in Scotland*, published by Messrs. Blackwood & Sons (1873)—a work of acknowledged historical value on the subject of which it treats.

Besides granting charters of affiliation, the chief use of the grand lodge, whether of England or Scotland, consists in its acknowledged authority to enforce uniformity of ceremonial and other observances, and to settle all disputes that may arise within the lodges under its charge. The officers of the grand lodge are to a large extent delegates from the respective lodges; the delegation being in the form of proxy masters and wardens. As a source of revenue, for each member made by a lodge, a fee must be remitted to the grand lodge, whereupon a diploma of brotherhood will be issued.

Modern freemasonry spread from Britain to the continent, to America, and to India. It was introduced into France in 1725, Russia in 1731, and Germany in 1740. grand lodges now exist in France, Belgium, Netherlands, Denmark, Sweden and Norway, Prussia, Saxony, Hamburg, Switzerland, Italy, Portugal, Greece, Canada, Nova Scotia, and New Brunswick, in Central and South America, and in British Columbia. Lodges in connection with European grand bodies exist in India, Africa, China, Polynesia, Turkey, Palestine, West Indies, Australia, and New Zealand. There are about forty grand lodges in the United States. Freemasonry is prohibited in Austria, Poland, Russia, and Spain, and by the pope.

The deep symbolical meaning supposed to be couched under the jargon of the masonic fraternity is probably as apocryphal as the dangers of masonry to government and order. A set of pass-words and a peculiar grip of the hand enable the initiated to recognize each other, and give a zest to their convivial meetings; and if the institution possesses any practical utility, it is in its enabling a mason, in a place where he is a stranger, to make himself known to his brother-masons, and claim their protection and assistance.

MASONS, FREE (*ante*). The claims of freemasonry to origin in a period of remote antiquity have recently received a certain amount of support. In the process of making the necessary preparations for the removal of the Egyptian obelisk at Alexandria to its new site at New York, in 1880, certain discoveries were made which were alleged to have a distinct masonic reference. These discoveries included a number of objects masonic in character, and the fact that the foundations and position of the monolith had been established according to rules which form a part of the traditions of the order. In regard to this whole matter of antiquity, there is nothing in the traditions of the order so exceptionally remarkable as to make any special demand on our credulity. Men have been constituted after the same fashion from the beginning of time; and, given the same motive and the same or a similar environment and like opportunities, they may be assumed to act in the same way. The organization of the craft-guild in northern and central Europe as early as the 7th century is a sufficient illustration of the tendency to association among men, and particularly among the laboring or "craft" classes, to prove this. We know that among the Greeks, and Romans also, such association occurred in various directions, and there is no sound reason for disbelief in the possible combination of the architects and master-builders of Rome in the time of Numa Pompilius, as is claimed by the masons. Whether we are to accept the traditions which point to Solomon's temple, and refer to the times of the ancient Egyptians for the period of the foundation of the order, is a matter not of vital importance; though the same reasoning that answers in the case of Rome is equally sound in that of Egypt. Certainly when one contemplates the pyramids, Memphis, Thebes, Denderah, and the other ruins of marvelous structures built by the Egyptian masons and architects, there is nothing absurd in the supposition that then, as now, associated effort might have been concerned; and that the associations concerned might have organized on some such basis as is involved in the traditional history of freemasonry. The Roman colleges of builders are said to have been created by Numa Pompilius in 715 B.C. In 52 A.D. the corporations of constructors were established in Great Britain. In A.D. 290 Caransius, commander of the Roman fleet, is said to have renewed the ancient constitution and privileges of the Roman colleges, with a view to gaining the favor of the builders, who were a very powerful association: the architect Albanus, sent to Great Britain as an inspector of the constructors, or masons, is credited with having been the first Christian martyr in Britain, he having been beheaded for preaching the doctrine of Christ. His rank of inspector became later on that of grand master. At this period, which was in the latter part of the 3d c., the city of York contained the most important lodges or colleges of builders in Britain. In the 4th and 5th centuries corporations of artists and operatives, so called, were instituted in Great Britain, and manuscript copies of their statutes are said to be still in existence in certain of the French libraries. In 614 pope Boniface IV. conferred by diploma upon the masonic corporations the exclusive privilege of erecting all religious buildings and monuments, and made them free from all taxation. The civil wars of this period paralyzed the development of the masonic corporations, and they took refuge in the monasteries, which thus became the schools of architecture —sending forth such architects as St. Aloysius, bishop of Noyen; St. Ferol, of Limoges; Dalmac, bishop of Rhodes; and Agricola, of Chalons (659–700). In some of the Anglo-Saxon documents which still exist in the libraries of England the masonic fraternities are styled "freemasons." In 925 A.D Athelstan convoked all the masonic

lodges of Great Britain; the order was re-organized; and the city of York was established as the seat of the grand mastership: 34 years later the archbishop of Canterbury, St. Dunstan, was named grand master of the fraternity. In 1040 Edward the Confessor assumed the protectorate of the order; and in 1100 king Henry IV. accepted the grand mastership. In 1145 the freemasons from upper Normandy were called to the aid of the builders of the cathedral of Chartres, and were publicly blessed by the archbishop of Rouen; they made a triumphal entry into the city of Chartres. In 1250 the grand lodge of Cologne was instituted; and in 1275 a masonic congress was convoked to hasten the building of the cathedral of Strasburg. The monopoly granted by pope Boniface IV. was confirmed by diplomas issued by pope Nicholas III. in A.D. 1277; and these were again confirmed by pope Benedict III. in 1334. In 1360 Germany had five grand lodges, Cologne, Strasburg, Bern, Vienna, and Magdeburg, upon which were dependent the local lodges of France, Belgium, Hesse, Swabia, Thuringia, Switzerland, Franconia, Bavaria, Austria, Hungary, and Styria. In the 15th c. the assemblies of freemasons in England were suppressed by act of parliament, but a few years later Henry VI. was initiated into the fraternity, his example being followed by nearly all the gentlemen of his court. In 1452 a new constitution was compiled at Strasburg, and in 1459, '34, and '69 masonic congresses were held in Ratisbon and Spire. A grand lodge of master masons was held in London in 1502, presided over by the king, Henry VII., who laid the corner-stone of the chapel of Westminster which bears his name. A congress of masons was held at Basle in 1563, and at Strasburg in 1564; and in 1607 king James I. of England proclaimed himself protector of the freemasons. In 1663 a general assembly of English masons took place at York, and was presided over by king Charles II. In 1666, at the time of the great fire in London, there were but seven lodges of masons in the city; and in 1703 these had declined to four, though Sir Christopher Wren, the aged grand master, exhibited great zeal in endeavoring to foster the progress, and increase of the order. In France, in 1539, Francis I. suspended all the corporations of workmen, and freemasonry became extinguished in that country, not to be revived until 1721. It is claimed by the masons that this act of Francis I. resulted in the abandonment of the practice of Gothic architecture, and the substitution for it of the *renaissance* style, of which school were the architects Delorme and Bullant, who built the Tuileries in 1577; Lescot and Goryon, the architects of the Louvre, built in 1571; Blondel and Bullet, who constructed the gates of St. Denis and St. Martin, of Paris, between 1674 and 1686; Mansart, who built the palace of Versailles and the Invalides in 1700 and 1725; and J. Soufflot, who erected the Pantheon: none of these architects were freemasons. It was in the year 1703 that the English masons forming the lodge of St. Paul, having completed the erection of the cathedral, passed the resolution which opened the doors of the order to others than practical masons and builders. This resolution reads as follows: "Resolved, that the privilege of masonry shall no longer be confined to operative masons, but be free to men of all professions, provided that they are regularly approved and initiated into the fraternity." This important decision entirely changed the nature of the society, and transformed it into the body as we find it to-day. In 1717 the grand lodge of London was constituted, and put into execution the resolution of 1703: see MASONS, FREE, *ante*. In 1864 the three grand lodges of Great Britain controlled 109 provincial grand lodges, with 1597 operative lodges under their jurisdiction, which extended their connections to every part of the globe. Freemasonry was introduced into Denmark, in 1783; France, 1721; in Sweden, in 1736; Russia, in 1731; Belgium, 1721; Holland, 1725; Germany, 1737; Switzerland, 1737; Italy, 1729; Portugal, 1735; Spain, 1727. It is claimed that a lodge was established in Halifax, Nova Scotia, as early as 1750, the first in the British dominions in America; but this statement is not fully credited. Of the five provinces which comprise the dominion of Canada, Prince Edward Island alone has its lodges subject to the grand lodges of Great Britain. The first lodge in the New England colonies was opened in Boston in 1733. After the war of independence, grand lodges were organized in all the states. The statistics of the order in America showed the following membership in the different states in 1880, including also the British provinces, or Dominion of Canada, and New Mexico:

Alabama	7,925	Indiana	26,665	Montana	664	Quebec	2,873
Arkansas	8,293	Indian Territory	343	Nebraska	3,117	Rhode Island	4,327
British Columbia	312	Iowa	18,486	Nevada	1,508	South Carolina	6,531
California	12,281	Kansas	6,687	New Brunswick	2,317	Tennessee	17,053
Canada	17,418	Kentucky	18,038	New Hampshire	7,688	Texas	17,340
Colorado	1,569	Louisiana	5,456	New Jersey	12,084	Utah	370
Connecticut	14,968	Maine	19,252	New Mexico	169	Vermont	7,978
Dakota	281	Manitoba	324	New York	75,918	Virginia	9,930
Delaware	1,235	Maryland	5,349	North Carolina	11,471	Washington	902
Dist. of Columbia	2,701	Massachusetts	25,926	Nova Scotia	3,424	West Virginia	3,385
Florida	1,842	Michigan	25,624	Ohio	28,836	Wisconsin	10,703
Georgia	12,491	Minnesota	7,061	Oregon	2,514	Wyoming	300
Idaho	358	Mississippi	9,849	Pennsylvania	36,948		
Illinois	38,610	Missouri	24,296	Prince Ed. Island	566	Total	582,556

MASON WASP, *Odynerus murarius*, a species of wasp, which makes its nest by boring a cylindrical hole in hard sand, or even in the plaster of walls, on which an exudation from the mouth seems to act so as to soften it sufficiently. At the orifice an outer tube is constructed, sometimes two or three inches in length, of pellets formed in the

excavation. In the interior an egg is deposited with a number of little caterpillars ready for food of the larva when hatched.

MASO'RA, or MASSORETH. See MASSORA, *ante*.

MASOVIA, or MAZOVIA, a district of Poland, bounded n. by Plock, e. by Podlachia, s. by Sandomir, w. by Kalisch and Posen; 7,646 sq. miles. During the early period of the independence of Poland it was a duchy on both sides of the Vistula which flows through it. In 1815 it formed a palatinate in the Russian kingdom of Poland with Warsaw as its capital. It is now under Warsaw, which forms a distinct government.

MASQUE, a species of dramatic performance much in vogue in England towards the close of the 16th and the beginning of the 17th century. It was in fact, the favorite form of private theatricals at the time. The masque appears to have originated in the practice of introducing in any solemn or festive procession men wearing masks, who represented either imaginary or allegorical personages. At first it was simply an "acted pageant," as in the well-known progresses of queen Elizabeth; but gradually it expanded into a regular dramatic entertainment, and in the hands of men like Fletcher and Ben Jonson attained a high degree of literary beauty. Jonson's masques were represented at court and were greatly relished. The taste for this kind of amusement, however, died away in the reign of Charles I.; nevertheless, to the time of that monarch belongs the finest masque, and one of the most splendid poems ever written—the *Comus* of Milton (1634). See Masson's *Life of Milton* (vol. i. page 542, et. seq.).

MASQUERADE, or MASKED BALL, a festive meeting in which the host and guests assume fictitious characters, and disguise themselves more or less for the occasion, the name being derived from the use of the mask. The public *mummeries* of former times, Easter plays, festivals of fools, etc., which were frequent in most parts of Europe, but somewhat various in different countries, probably suggested the idea of the masquerade, which, however, was not open to all, according to the well-understood rules of these ancient amusements, but was limited to some select class, or to those who paid a certain sum for admission. Catharine de' Medici introduced the regular masquerade at the French court. It found its way to England in the reign of Henry VIII., but did not reach any of the courts of Germany till the end of the 17th century. The *bal costumé* is a very modified and much less objectionable form of the masquerade. During the carnival, public masquerades are held in all the theaters and dancing-saloons of Paris, and on these occasions scenes of the most disgraceful profligacy are said to be enacted in spite of the strict supervision of the police.

MASS (Lat. *Missa*), the name given in the Roman Catholic church to the eucharistic service which in that church, as well as in the Greek and other oriental churches, is held to be the sacrifice of the new law, a real though unbloody offering, in which Christ is the victim, in substance the same with the sacrifice of the cross, and instituted as a commemoration of that sacrifice, and as a means of applying its merits, through all ages, for the sanctification of men. The doctrine of the mass, as understood by Roman Catholics, presupposes the eucharist, although the latter doctrine does not necessarily involve the notion of a sacrifice, and may even be held by those who deny the sacrificial character of the eucharistic rite. The arguments for and against this belief, on which the mass is founded, do not fall within our province, which limits us to a brief history and explanation of the rite as it is found among Catholics and the members of other communions in which it is observed. Without entering into discussions as to the primitive character of the eucharistic rite, it will be enough to observe that the very earliest records of Christian history, whether in the Acts of the Apostles, the canonical Epistles, or the writings of the most ancient of the fathers, plainly evince the existence from the beginning of a rite, which it is impossible not to regard as in its general character identical with that which still constitutes in most Christian communities the chiefest and most solemn part of their public worship. This rite is believed by Roman Catholics to have been partly a sacrifice, partly a communion and participation thereof by the faithful; and of the names by which it is called in the works of the early fathers, some—as for example, *agape*, and *hagia synaxis*, refer to the latter, while others—as *thusia*, *prosphorē*, *hiereion*—indicate the former signification. The etymology of the name now in use is somewhat obscure, but it is commonly referred to the proclamation made by the deacon at the close of the service—"*Ite; missa est*" ("Go; the assembly is dismissed"). By primitive use the communion of the faithful appears always, unless in exceptional cases, to have formed part of the eucharistic service; but afterwards it came to pass that the officiating priest only communicated, whence arose, especially in the Western church, the practice of "private masses," which has been in later times a ground of complaint with dissentients from Rome, even those who in other respects approach closely to the Roman doctrine. In the ancient writers a distinction is made between the "mass of the catechumens" and the "mass of the faithful"; the former including all the preparatory prayers, the latter all that directly regards the consecration of the elements and the communion, at which the "discipline of the secret" forbade the presence of the catechumens. With the cessation of this discipline, the distinction of names has ceased, but the distinction of parts is still preserved, the mass of the catechumens comprising all the first part of the mass as far as

"the preface." The mass is now, in general, denominated according to the solemnity of the accompanying ceremonial, a "low mass," a "chanted mass," or a "high mass." In the first a single priest simply *reads* the service, attended by one or more acolytes or clerks. The second form differs only in this, that the service is *chanted* instead of being *read* by the priest. In the high mass, the service is chanted in part by the priest, in part by the deacon and sub-deacon, by whom, as well as by several ministers of inferior rank, the priest is assisted. In all these, however, the service, as regards the form of prayer, is the same. It consists of (1) an introductory prayer composed of the 41st Psalm, together with the "general confession"; (2), the introit, which is followed by the thrice-repeated petition, "Lord, have mercy," "Christ, have mercy," and the hymn, "Glory to God on High"; (3), the collect, or public and joint prayers of priest and people, followed by a lesson either from the Epistles or some book of the Old Testament, and by the gradual (q.v.); (4), the gospel, which is commonly followed by the Nicene creed; (5), the offertory (q.v.), after the reading of which comes the preparatory offering of the bread and wine, and the washing of the priest's hands in token of purity of heart, and the "secret," a prayer read in a low voice by the priest; (6), the preface, concluding with the trisagion or "thrice holy"—at which point, by the primitive use, the catechumens and penitents retired from the church; (7), the "canon," which is always the same, and which contains all the prayers connected with the consecration, the elevation, the breaking, and the communion of the host and of the chalice, as also the commemorations both of the living and of the dead; (8), the "communion," which is a short scriptural prayer, usually appropriate to the particular festival; (9), the "post-communion," which, like the collect, was a joint prayer of priest and people, and is read or sung aloud; (10), the dismissal with the benediction, and finally, the first chapter of St. John's gospel. Great part of the above prayers are fixed, and form what is called the "ordo" or "ordinary" of the mass. The rest, which is called the "proper of the mass," differs for different occasions; some masses being "of the season," as of lent, advent, passion-tide, "quarter-time," etc., others, of "mysteries," as of the nativity, the circumcision, the resurrection; others again, of saints, as of an apostle, a martyr, or a confessor; others again, "votive," as "of the passion," "of the dead," "for peace," etc. In all these various classes, as well as in the individual masses under each, the "proper" portions of the mass differ according to the occasion, and in some of them certain portions of the "ordinary," as the "Glory to God on High," the "gradual," or the "Nicene creed" are omitted. On one day in the year, Good-Friday, is celebrated what is called the "mass of the presanctified," in which no consecration takes place, but in which the priest communicates of the host which was consecrated on the preceding day. This usage is found also in the Greek church, not alone on Good-Friday, but on every day during the lent, except Saturday and Sunday. In the celebration of mass the priest wears peculiar vestments, five in number—two of linen, called "amice" and "alb"; and three of silk or precious stuffs, called "maniple," "stole," and "chasuble," the alb being girt with a cincture of flaxen or silken cord. The color of these vestments varies with the occasion, five colors being employed on different occasions—white, red, green, purple or violet, and black, and they are often richly embroidered with silk or thread of the precious metals, and occasionally with precious stones. The priest is required to celebrate the mass fasting, and, unless by special dispensation, is only permitted to offer it once in the day, except on Christmas day, when three masses may be celebrated.

In the Greek and oriental churches the eucharistic service, called in Greek *theia leitourgia* (the divine liturgy), differs in the order of its parts, in the wording of most of its prayers, and in its accompanying ceremonial from the mass of the Latin church (see LITURGY); but the only differences which have any importance as bearing upon doctrine are their use of leavened bread instead of unleavened; their more frequent celebration of the "mass of the presanctified," to which reference has already been made; the Latin use of private masses, in which the priest alone communicates; and, in general, the much more frequent celebration of the mass in the Latin church. The sacred vestments, too, of the Greek and eastern rites differ notably from those of the Latin; and in some of the former—as, for example, the Armenian—a veil is drawn before the altar during that part of the service in which the consecration takes place, which is only withdrawn at the time of the communion. The service sometimes used on shipboard, and improperly called *missa sicca* (dry mass), consists simply of the reading of the prayers of the mass, but without any consecration of the elements. It was resorted to with a view to avoiding the danger of spilling the sacred elements, owing to the unsteady motion of the ship. It is sometimes also called *missa nautica* (ship mass).

MAS'SA, a t. in the province of Carrara-Massa, central Italy; pop. '74, 18,031. It is on the Frigida, and commands a fine prospect of the sea on the w., and of picturesque and fruitful hills on the n.e. The climate is almost unrivaled in Italy for mildness and salubrity. The oldest part of the town is on a hill; the newest part, with its fine buildings and spacious streets and squares, on the plain below. Among the buildings is a national palace, a noble structure, built by the princes of the house of Cybo. The history of the town is traced back to the 9th century. It was then and for a long time subject to the republic of Lucca, but in the 15th c. the Cybo family became its feudal lords.

MASSAC, a co in s. Illinois; has the Ohio river for its s. boundary, separating it from Kentucky; 230 sq.m.; pop. '80, 10,443—9,900 of American birth, 1703 colored. Forests of oak, elm, maple, ash, hickory, and the tulip tree diversify its surface, and the cypress grows luxuriantly in its swamps. An under-stratum of carboniferous limestone is the foundation of the soil, which, in land not subject to overflow, is fertile, and produces a large yield annually of tobacco, sweet-potatoes, butter, honey, and sorghum, and all varieties of grain and fruit. Cattle, sheep, and swine are raised, and the vine is cultivated to some extent. Its mineral products are coal and lead. Among its industries are the manufacture of wagon materials, tobacco, and snuff. It has flouring mills, potteries, and ship-yards on the Ohio river. Seat of justice, Metropolis.

MASSACHUSETTS, one of the 13 original states of the American union, and oldest of the New England states, lies between lat. 41° 15'—42° 53' n., and long. 69° 56'—73° 32' w., being 160 m. from e. to w., and from 47 to 110 from n. to s., with an area of 7,800 sq.m.; it lies s. of Vermont and New Hampshire, and borders on the Atlantic. There are 14 counties, and the chief towns are Boston, the capital, Lowell, Lawrence, Salem, New Bedford, Fall River, Lynn, Springfield, Cambridge, and Worcester. On the south-eastern coast are the islands of Nantucket and Martha's Vineyard. The principal rivers are the Connecticut, Merrimac, and Housatonic, which afford water-power to many manufacturing cities and villages. The country is hilly, and much of the soil sterile, but in the river-valleys it is fertile. The most important mineral products are granite and syenite, sand for glass, and iron. The chief agricultural products are Indian corn, apples and pears, grass and hay; but the manufactures are very large and various. In 1870 there were 194 cotton-mills, producing goods to the value of $59,679,153, and 182 woolen-mills, producing goods worth $39,489,242, besides numerous carpet-mills, iron-foundries, rolling-mills, nail factories, and machine shops. The manufacture of boots and shoes for the same year was $88,399,583. There are 60 railway companies, and in 1878 above 2,000 m. of railway were open. The fisheries of Massachusetts have long been one of its leading industries. There are over 200 national banks, about 180 savings-banks, numerous asylums, etc. Massachusetts has about 6,000 schools, a university, and 7 colleges; and in 1878 there were 345 newspapers and periodicals. The state income for 1877-78 was $7,244,900; the debt in 1878 was $33,020,000. Massachusetts was discovered by the Cabots in 1497. In 1614 it was visited by capt. John Smith. In 1620 the *Mayflower*, 180 tons, sailed from Southampton with 102 Puritan settlers, and landed at Plymouth, Mass., Dec. 22. Half died from cold and hardship the first year. In 1637 the colony suffered from Indian massacres; and in king Philip's war, 1675, 12 towns and 600 houses were burned. The war of the revolution of 1776 began in Massachusetts with the battles of Lexington and Bunker Hill. Pop. '10, 472,040; '60, 1,231,065; '70, 1,459,351; '75, 1,651,652.

MASSACHUSETTS (*ante*). There is reason to believe that portions of south-eastern Massachusetts, including the islands of Nantucket and Martha's Vineyard, were discovered by the Norsemen not far from 1000 A.D., and that various settlements were made in the next 300 years, none of which, however, gained permanence. In 1497 John and Sebastian Cabot again discovered the Massachusetts coast, and the English claimed it on that account. In 1602 Bartholomew Gosnold and 22 English colonists made a settlement on the Elizabeth islands, between Buzzard's bay and Vineyard sound, now constituting the township of Gosnold in Dukes co.; but it was in a short time abandoned. There were other expeditions to the coast in subsequent years, but the Plymouth colony was the first that proved successful. On Sept. 6, 1620 (O. S.), this colony, composed of about 100 English, who had sought exemption from religious persecution in Holland, having embarked from Delft Haven, set sail from Plymouth, England, in the *Mayflower*, of 180 tons, to find a home in America. On Nov. 9 they reached cape Cod, and anchored in the roadstead off Provincetown. An exploring party was sent in search of a suitable place to found a settlement, and the colonists landed at Plymouth, Dec. 22 (N. S.). Before landing they drew up and subscribed a compact or frame of government for the new settlement, and elected John Carver governor for one year. In four months nearly one-half the colonists died from exposure to the cold and the lack of wholesome food. Shortly after landing they entered into a treaty of peace with the Indian chief Massasoit and his tribe, which remained unbroken for a long time. Through the influence of capt. Miles Standish the disputes with other tribes were soon settled. In the spring of 1621 the *Mayflower* returned to England, and soon afterwards governor Carver died and was succeeded by William Bradford, with Isaac Allerton as assistant. During the next two years the colonists endured many privations, but in 1623 they were relieved by a bountiful harvest. The plan of property in common, which they adopted at first, was now abandoned. In 1622 a Mr. Weston, of London, who had been connected with the Plymouth colonists, obtained a patent and founded a new settlement in Wessagussett, now Weymouth. The Plymouth colony failed to obtain a patent, and was forced to carry on its government independently of the royal sanction. This they did, however, with perfect success, upon a plan not unworthy of the democracy of a later time, since the right of the people to govern themselves was fully recognized. In 1628 an expedition, organized by an English company, and commanded by John Endicott, landed at Salem. The company had obtained a grant of the territory lying between the

Atlantic and Pacific, and extending to a point 3 m. s. of the river Charles and 3 m. n. of the river Merrimac. After persistent efforts a royal patent was obtained for "the company of the Massachusetts bay," and the associates were constituted a body politic, with a governor, deputy, and 18 assistants, to be annually elected, and a general assembly of the freemen, with legislative powers, to meet four times in a year, or oftener if necessary. In 1629 the colony was reinforced, and the government and patent of the company were transferred from London to New England. The old officers resigned, giving place to others chosen from among those who were about to emigrate, John Winthrop being elected governor. From this time the colony grew rapidly, receiving an accession at one time of about 1000 persons, who came over in 17 vessels. Charlestown, Boston, Watertown, Dorchester, Roxbury, Mystic, Salem, Saugus (Lynn), and other places were at this period selected as sites for settlements. The colony for a time endured great hardships, losing many of its members by death, while others returned in discouragement to England. But new emigrants came to take the places of the departed, and still the colony grew. A spirit of religious intolerance, which was characteristic of all parties in those times, and which was partly the product of the bitter persecutions from which the colonists had fled, manifested itself in the banishment of Roger Williams and Anne Hutchinson, and a general persecution of the Quakers. Some disputes between the magistrates and people as to their respective powers, caused no little commotion. At first the colonists were allowed to manage their affairs without the interference of the home government; but at length they were suspected by the crown of a design to make themselves independent, and an attempt was made to annul their charter, a commission for their government being formed with archbishop Laud at its head. An order was issued to the colony to surrender its charter, but the settlers found a way to avoid a compliance, and measures were adopted to fortify Boston, Charlestown, and Dorchester against a possible assault. The colonists found their best protection, however, in the political agitations of the mother country, which so absorbed the attention of the government that it had no time to prosecute its schemes in America. The restoration of the Stuarts created fresh troubles for the colony, but at length, in 1662, the king confirmed the charter and made a conditional promise of amnesty for past political offenses. He insisted, however, upon his right to interfere in the affairs of the colony, demanded the repeal of all laws derogatory to his authority, required the complete toleration of the church of England, the taking of an oath of allegiance, and the administration of justice in his name. To these demands some of the colonists were disposed to yield for the sake of peace, while others steadily resisted them. Commissioners were sent over from England to investigate the affairs of the colony, but, being unable to accomplish anything, they were finally recalled. In 1643 the colonies of Massachusetts Bay, Plymouth, Connecticut, and New Haven entered into an alliance for mutual protection, which lasted 20 years and was superseded by a still closer confederation. In 1675 king Philip's war broke out, lasting more than a year, and subjecting the colonists to great loss of life and property. No less than 12 or 13 towns were destroyed by the Indians, 600 houses were burned, one in 20 of the men of the colony were killed on the field, and a debt of $500,000—an enormous sum for that day—was incurred. The troubles with the king continued; Massachusetts lost her jurisdiction over New Hampshire, and retained possession of Maine only by purchase. In 1684 the difficulties with the crown being still unsettled, the charter was declared forfeited. Joseph Dudley was appointed president of Massachusetts, the general court was dissolved, and a royal commission superseded the government under the charter. In 1686 Dudley was superseded by sir Edmund Andros, whose arbitrary proceedings have left a blot upon his name. In 1689 the men of Boston, aided by others from the country, rose in arms against him, put him and others in prison, reinstated the former magistrates, and restored the general court to its authority. Plymouth joined in the revolt, imprisoning the agent of Andros, and reinstating the former governor. A new charter, uniting the Massachusetts and Plymouth colonies, was granted in 1692. Under this charter the governor, lieutenant-governor, and secretary were appointed by the king. Sir William Phips was the first governor, and it was at about this period that the witchcraft delusion which had long held sway in Europe, broke out in the colony, blotting its history with a record of superstition and blood. It is to the honor of Massachusetts, however, that it so soon awoke from this inherited delusion; long after the evil had been exposed and forsaken here, the courts of European countries were still sentencing "witches" to death. There were fresh troubles with the Indians, which did not terminate till 1725.

Massachusetts was deeply involved in the struggles between England and France for ascendency in the new world, which did not finally cease until the union of Canada to England and of Louisiana to Spain in 1763. Then followed the controversies with England, which led step by step to the war of the revolution, which ended in the recognition of the United States as an independent nation. In these controversies Massachusetts bore a leading part, as she did in the war itself, and in laying the foundations of the new republic. The British government imposed the most onerous taxes upon the colonists, and sought to collect them by force, in the face of the most earnest remonstrances. The colonists at length refused to submit to exactions which they regarded as subversive of the fundamental principles of English liberty. They insisted that they could not be justly taxed while they were excluded from representation in parliament, and upon this issue

they were willing, if necessary, to go to war. The commerce of the colony, moreover, was hampered by the most arbitrary and irritating restrictions. The spirit of liberty, which the colonists had brought with them from their old home, had been developed in their self-governing church and state until, in the hearts of their children, it had grown too strong to be subdued, and found expression in every form of indignant remonstrance—till at last blows were substituted for words. The other colonies were appealed to—and not in vain—for sympathy and support. The first blood in this contest was shed in the Boston massacre, a street riot in 1770; next came the destruction of the tea in Boston harbor in 1773, the opposition to the port bill in 1774, the representation of the colony in the general congress, the seizure of the arsenal at Charlestown, etc., and finally in April, 1775, the bloody contest at Lexington and Concord, which was the actual opening of war.

The surface of the state is mostly uneven, and in some places rough and mountainous. Two separate ranges of the Green mountains, the Taghkanic and the Hoosic, enter the western part of the state from the n., and, with their outlying hills, present some of the most picturesque scenery to be found in New England. The Taghkanic is the highest and most westerly of these ranges, its principal elevations being Saddle mountain, or Greylock, 3,505 ft., and Mt. Everett, 2,624 ft. in height. The Hoosic range, in its highest part, does not rise above 1600 feet. Near the western bank of Connecticut river are several isolated peaks, Mt. Tom and Sugarloaf being the most prominent, while on the eastern side of the river, near South Hadley, stands Mt. Holyoke, in solitary beauty, commanding an extensive and lovely prospect. Another isolated mountain is the Wachusett, in Princeton, near the center of the state, which has an elevation of 2,018 feet. That portion of the Connecticut valley which lies within the boundaries of the state is remarkable for beauty of scenery and fertility of soil. The eastern portion of the state is less broken; some of it, including cape Cod, is level and sandy. The Connecticut river runs through the state from n. to s. for more than 50 miles. About one-third of the state lies westward of this river. The Housatonic, still further w., rises in the Green mountains on the n. border, and flows s. through Connecticut to Long Island sound. The Hoosic, one of the tributaries of the Hudson, rises in the n.w. corner of the state, but soon passes beyond its limits. The principal western tributaries of the Connecticut are the Westfield and Deerfield rivers, which are of considerable size; while the tributaries of the same streams from the e. are Miller's and Chicopee rivers. The Merrimac, which rises in New Hampshire, flows 35 m. to its mouth through the n.e. corner of the state, receiving on the way the Nashua and Concord rivers, and furnishing immense water-power for the great manufacturing towns, Lowell, Lawrence, Haverhill, etc. The rivers at the e. portion of the state are the Charles, on whose banks are Newton, Cambridge, and other large towns, and at whose mouth lies the city of Boston; the Blackstone, with almost unlimited water-power, and whose charming valley is lined with a cordon of manufacturing villages; and the Taunton, with its numerous branches. There are in the state many lakes and ponds, some of which are of unrivaled beauty, but none of them large enough to be useful for navigation. The coast is indented with numerous bays, large and small, and dotted with islands, some of which are of considerable size. The principal bays or sounds are Buzzard's, with many inlets and harbors, Vineyard, Edgartown, Nantucket, Cape Cod, Wellfleet, Duxbury, Massachusetts, Lynn, Nahant, Marblehead, Salem, Beverly, Gloucester, and Annisquam. The harbor of New Bedford, on Buzzard's bay, is, next to that of Boston, the best in the state. The principal islands are Nantucket, Martha's Vineyard, and the Elizabeth group of 16 off cape Cod.

The minerals of the state have not thus far been a source of much profit. In Bristol and Plymouth counties are deposits of anthracite, but of a very poor quality. In some places in the Connecticut valley are veins of lead, copper, and zinc, but not in quantities to justify working. Beds of iron ore in the Housatonic valley have been worked for many years, and the disintegrated quartz beds yield glass-sand of the finest quality. In 1874 deposits of silver, lead, and gold were discovered in Essex county, near Newburyport, the working of which has not thus far proved profitable. In some portions of the Connecticut valley are found extensive fossil footprints of birds and other animals, some of which must have been of gigantic size. The valleys of the principal streams are productive, but the other portions of the state can be made so only by enrichment.

Wild animals have been nearly exterminated. Bears, wolves, panthers, wildcats, and deer, formerly plentiful, are now almost never seen. Squirrels, rabbits, and game-birds are numerous. Owls, hawks, gulls, wild-ducks, and a great variety of song-birds are common. Reptiles exist in considerable variety, but few of them are venomous. The edible fish on the coast are abundant, embracing cod, halibut, mackerel, haddock, bass, and many other species.

The climate on the coast is variable, with prevailing e. winds, especially in the spring and early summer. In the interior it is more equable, and in the mountainous regions the winters are very cold. The mean annual temperature is about 48°.

Of the whole area of the state less than one-half is improved. In 1870 the number of farms was 26,500, embracing 1,736,221 acres of improved land, 706,714 acres of woodland, and 287,348 acres of other land unimproved. The cash value of farms was $116,432,784; of farming implements and machinery, $5,000,879; wages paid during the year,

$5,821,032; total estimated value of all farm products, $32,192,378; of orchard products, $939,854; of produce of market-gardens, $1,980,321; of forest products, $1,616,818; of home manufactures, $79,378; of animals slaughtered or sold for slaughter, $4,324,658; of all live stock on farms, $17,049,228. The chief productions were: Wheat, 34,648 bush., about one-half of which was spring and the other half winter; rye, 239,227 bush.; corn, 1,397,807 bush.; oats, 797,664 bush.; barley, 133,071 bush.; buckwheat, 58,049 bush.; peas and beans, 24,690 bush.; potatoes, 3,026,363 bush.; hay, 597,455 tons; tobacco, 7,312,885 lbs.; wool, 306,659 lbs.; butter, 6,559,161 lbs.; cheese, 2,245,873 lbs.; hops, 69,910 lbs.; maple sugar, 399,800 lbs.; honey, 25,299 lbs.; milk sold, 15,284,057 gallons. Horses on farms, 41,039; horses not on farms, 45,227; milch cows, 114,771; working oxen, 24,430; other cattle on farms, 78,851; neat cattle not on farms, 52,263; sheep, 78,560; swine, 49,178.

In proportion to the population the mechanical industries of Massachusetts exceed those of any other state. The latest statistics now accessible (Jan., 1881) are those of the state census of 1875. Whole number of manufacturing establishments, 10,915; total value of buildings, $80,997,503; value of average stock on hand, $89,061,506; value of machinery, $73,434,914; total capital invested, $267,074,802; number of persons occupied in manufacturing and mechanical employments, 316,459, of whom 233,252, were males and 83,207 were females. Of the males, 228,469, and of the females, 77,238, were above 15 years of age. The average yearly wages of both sexes and all ages was $475.76. Total amount of wages for the year, $126,711,583. The leading industries of the state, aside from agriculture and commerce, with the amount of their products respectively, as reported by the census of 1870, were as follows: Agricultural implements, $1,033,590; bleaching and dyeing, $22,250,429; boots and shoes, $88,399,583; carpentering and building, $12,429,739; clothing, $21,724,020; cotton goods, $56,257,580; cotton thread, twine, and yarn, $3,009,543; cutlery, $6,215,325; drugs and chemicals, $1,617,904; fisheries (exclusive of whale), $1,800,399; flouring and grist-mill products, $9,720,374; furniture, $11,369,148; glass, including cut and window, $2,552,000; hardware, $2,515,429; hats and caps, $3,416,191; hosiery, $3,213,481; india rubber and elastic goods, $3,183,218; iron, forged and rolled, $6,699,907; iron nails and spikes, $5,986,144; wrought iron pipe, $1,407,000; iron castings, including stoves and hollow ware, $7,046,702; tanned leather, $9,984,497; leather curried, $19,211,330; morocco, tanned and curried, $3,158,020; lumber, planed and sawed, $6,651,670; machinery of all kinds, $16,426,742; marble and stone work, $2,178,450; molasses and sugar refined, $7,665,485; musical instruments, $3,906,179; oil (fish and linseed), $3,581,786; paper of all kinds, $13,687,481; printing cotton and woolen goods, $17,325,150; printing and publishing of all kinds, $8,390,976; ship-building and repairing, $2,070,201; shovels and spades, $1,820,526; stone, $1,294,148; straw goods, $4,869,514; tin, copper, and iron ware, $2,785,674; upholstery, $2,424,457; watches, $1,281,160; wire, $2,854,672; woolen goods, $39,489,242; worsted goods, $8,280,541; mining and quarrying, $1,493,522; fisheries, $6,215,325.

The foreign and domestic commerce of Massachusetts is varied and extensive. The imports in 1874 amounted to $52,737,280; foreign exports, $2,280,772; domestic exports, $28,455,515. Vessels entered during the year at the several ports, 3,066, aggregating 783,541 tons; cleared, 2,982, aggregating 708,048 tons; registered, 2,563, aggregating 458,373 tons. The number of vessels entered in the coastwise trade was 2,655, of 2,167,386 tons; cleared, 2,700, of 2,191,829 tons. Vessels engaged in the general fisheries, entered at Newburyport, 105, of 3,677 tons; cleared, 116, of 3,922 tons. The most important centers of the fishing trade are Gloucester and New Bedford, the former unsurpassed for the magnitude of its cod and mackerel fisheries, the latter the leading market for the products of the whale. The product of the American whale fisheries for the year ending June 30, 1874 (nearly all from Massachusetts), amounted to $2,291,896, including sperm oil valued at $1,250,987; other whale oil, $775,919; and whalebone, $264,990. The number of vessels in the state engaged in the whale fisheries was 170; in the cod and mackerel fisheries, 1026, of 49,578 tons. According to the census of 1870, more than half the products of the fisheries of the United States (exclusive of the whale fisheries) were the fruits of Massachusetts enterprise and industry. The capital invested in the business was $4,287,871; number of persons employed, 8,993; value of products, $6,215,325. The number of vessels built in the state in 1874 was 77, of 31,499 tons, including 5 steamers of 689 tons.

The rivers of Massachusetts are not navigable to any considerable extent, but a network of railways, extending to almost every part of the state, offers unbounded facilities for trade and travel. Trunk lines lead from Boston in every direction, and branches extend to or near a vast number of the smaller towns, so that by far the greatest number of inhabitants outside of that city may, if they wish, leave their homes in the morning, go there and transact business, and return the same evening. The oldest of the roads (that between Boston and Lowell, 25 m.) was opened for use in 1835. In 1874 the number of miles of railway in operation in the state was 1782. More than one-fourth of the main lines are laid with steel rails. There are over 60 corporations, but, owing to the combinations between different lines, 31 boards of direction control all the roads. The average cost of these roads per mile was nearly $57,000; the cost of equipment about $7,700 per mile. One of the lines, extending through the state in a n.w. direction from Boston,

passes through Hoosac mountain by means of a tunnel 4¾ m. in length, costing over $14,000,000, for which the state lent its credit. The aggregate capital stock of the 63 companies in 1876 was $118,170,201; amount of their indebtedness, $52,914,825; gross income, $30,008,513; net income, $9,344,088. All the roads are under the supervision of a board of railroad commissioners appointed by the state, and wielding large powers. The board settles disputed questions between the different roads and between the roads and the public. It is compelled to hear and investigate all complaints against the roads, and find out and recommend a remedy, and its supervisory powers extend to the care of accounts, the examination of tracks, bridges, etc., and the investigation of accidents. In 10 years the cost of this supervision was one-twentieth part of one per cent of the gross receipts of the roads.

The number of national banks in the state in 1874 was 220, with a capital of $93,039,350; circulation outstanding, $59,051,019. In 1876 there were 176 savings-banks, with deposits amounting to $244,596,614; number of depositors, over 700,000. There were also 4 loan and trust companies, with $1,700,000 of capital, and $6,924,270 of deposits. The number of fire and marine insurance companies was 124, with $52,197,870 of capital, and net assets aggregating $6,924,270. The number of life insurance companies in 1874 was 6, 4 of them mutual. The assets of the 6 companies amounted to $25,218,611, their total liabilities to $22,291,740, their total income to $6,749,854; amount insured by existing policies, $132,951,879, of which $630,000 was reinsured.

The population of Massachusetts 1790 was 378,787; 1810, 472,040; 1830, 610,408; 1850, 994,514; 1860, 1,231,066; 1870, 1,457,351, of whom 703,779 were males, 753,572 females, and 13,947 colored; while 579,844 were engaged in agriculture, 131,291 in professional and personal services, 83,078 in trade and transportation, and 292,665 in manufacturing and mechanical employments. Pop. '80, 1,783,012.

Massachusetts has always taken high rank in educational affairs. The school statistics of 1876–77 are: Number of public schools, 5,556; number of children between 5 and 15, 296,375; number in the schools, 307,832; number of male teachers, 1176; of female teachers, 7,544; teachers who have attended normal schools, 1898; average term of the schools, 8 months and 15 days; average monthly wages of male teachers, $82.22; of female teachers, $34.20; amount raised by taxation for the support of schools, $4,331,675; income of funds appropriated at the option of the towns for the same object, $59,229; amount of local school funds, $1,898,891; income of local school funds, $119,968; income of state school fund, $76,320; amount expended in building and repairing school-houses, 956,483; number of high-schools, 216; number of incorporated academies, 44; average number of academy scholars, 3,939; number of private schools and academies, 385; evening schools, 92; total annual cost of public education, $5,582,519. There are 5 normal schools, one each at Framingham, Westfield, Bridgewater, Salem, and Worcester, and a normal art school in Boston. Total annual appropriation of the state for normal instruction, $76,000. The state school fund amounts to $2,067,581; the Todd normal school fund to $12,100; the agricultural college fund to $360,067. The institutions for collegiate and scientific instruction are numerous and of a high order of excellence. The oldest of these is Harvard college at Cambridge, founded in the infancy of the colony in 1636. The others, in the order of their organization, are: Williams college (Congregational), Williamstown; Amherst college (Congregational), Amherst; college of the Holy Cross (Roman Catholic), Worcester; Tufts college (Universalist), Medford; Boston college; Boston university (Methodist Episcopal); Mount Holyoke seminary for girls (Congregational), South Hadley; Sophia Smith college for women, Northampton; Wellesley college for women, Needham. The theological institutions are: Andover theological seminary, Andover, Congregational; Newton theological institution, Newton, Baptist; Harvard divinity school, Unitarian; New Church theological school, Waltham; Boston university school of theology, unsectarian (under Methodist auspices); Episcopal theological school, Cambridge; Tufts college divinity school, Universalist. There are 2 law schools, that of Harvard college and that of the Boston university. The schools of medicine are 6 in number, viz.: Boston university school, Harvard medical school, New England female medical college, Boston dental college, Harvard dental school, Massachusetts college of pharmacy. The schools of science are 4 in number, viz.: Massachusetts agricultural college at Amherst, Massachusetts institute of technology in Boston, Lawrence scientific school at Cambridge, Worcester county free institute of industrial science. The number of professors and instructors in all these institutions in 1874 was 421, of students, 3,331; value of grounds and buildings, $4,062,760; amount of endowments, $8,314,173; income from productive funds, $469,675; aggregate number of volumes in libraries, 337,132.

The institutions for special classes are as follows: Clark institution for deaf mutes, Northampton; Boston school for deaf mutes; Perkins institution and Massachusetts asylum for the blind, Boston; Massachusetts school for idiotic and feeble-minded youth, Boston; institution for education of feeble-minded youth, Barre; Hillside school, Fayville. The state provides for the deaf and dumb also at the American asylum for the deaf and dumb, Hartford, Conn. The reformatory, industrial and truant schools are as follows: State reform school, Westboro; state industrial school, Lancaster; Massachusetts infant asylum, Brookline; state primary school, Monson; Boston house of reformation; Lowell house of reformation; Plummer farm school, Salem; industrial school, Lawrence;

truant school, Cambridge; truant school, Worcester; temporary asylum for discharged female prisoners, Dedham. There are institutions for the insane at Worcester (2), Taunton, Northampton, Somerville, South Boston, Ipswich, and Danvers, and almshouses at Tewksbury and Bridgewater. There are three state-prisons, one at Charlestown, one at Concord, and one for women (under the care of women) at Sherborn; also one state workhouse, and 15 houses of correction. The whole number of commitments to all the prisons (including county jails) in 1874 was 20,752, of whom 16,656 were males, and 4,096 females.

According to the census of 1870 the number of libraries in the state, of all classes, was 3,169, of which 1,544 were public. The public libraries contained 2,010,609, and the private 1,007,204 volumes. There is reason to believe that these figures, too small at the time, might safely be doubled in amount now.

In 1875 the number of newspapers and periodicals in the state was 341, including 26 dailies, 222 weeklies, and 58 monthlies, with an aggregate circulation of 141,774,382 copies annually. According to the census of 1870 there were in the state 1848 religious congregations, 1764 church edifices, and $24,488,285 of church property. The principal denominations, in order of members, are as follows:—Congregational, Methodist, Baptist, Roman Catholic, Unitarian, Episcopal, Universalist, Christian, Friend, Spiritualist, Freewill Baptist, Swedenborgian, Presbyterian. The number of church-members was 5,020.

The state debt, Jan. 1, 1879, was $33,020,464; debts of cities and towns in 1878, $68,864,685. The cash value of real estate in 1874 was $1,289,308,763; of personal personal property, $542,292,402; total taxes, state, county, city, town, and highway, $28,700,605; number of dwellings in the state, 249,738.

The constitution is in substance that of 1780, with amendments adopted at different periods since. The governor, with the other principal executive officers, is elected annually by the people, and has a salary of $5,000. A council composed of 8 members elected annually by districts, gives him advice upon matters of official duty. The legislative power is vested in a general court, composed of a senate of 40 members and a house of representatives of 240 members, elected respectively by senatorial and representative districts. The councilors are paid $5 for each day's attendance, and $2 for every 10 miles' travel. Senators and representatives are paid at the same rate, and $1 for every 5 miles' travel from their homes. The election occurs annually, on the Tuesday following the first Monday in November, and the general court or legislature meets on the first Wednesday in January. The supreme judicial court consists of a chief-justice (salary, $5,500), and five associate justices (salary, $5,000 each). The superior court consists of a chief-justice (salary, $4,500), and nine associate justices (salary, $4,000 each). The judges of both these courts are appointed by the governor, with the advice and consent of the council, and hold office during good behavior. Slavery in Massachusetts was judiciously abolished at an early day, by the operation of a clause in the bill of rights of 1780.

In 1786 occurred the revolt known as "Shays's rebellion," in the western part of the state. It was occasioned by the poverty of the people after the revolutionary war, which made them impatient under taxation, and was soon suppressed, though not without some loss of life.

A survey has been made for a ship canal across Cape Cod, and the work of making it has already been commenced. When completed it will greatly shorten the distance by sea between Boston and New York, and enable masters of vessels to avoid some of the worst perils of the voyage as at present conducted.

The electoral votes of Massachusetts for president and vice-president of the United States have been cast as follows:—1789, 10 for Washington and Adams; 1792, 16 for Washington and Adams; 1796, 16 for John Adams for president, and 13 for Pinckney; 2 for S. Johnston, and 1 for Oliver Ellsworth for vice-president; 1800, 16 for Adams and Pinckney; 1804, 19 for Jefferson and George Clinton; 1808, 19 for C. C. Pinckney and Rufus King; 1812, 22 for George Clinton for President, and 20 for Jared Ingersoll and 2 for Elbridge Gerry for vice-president; 1816, 22 for Rufus King and John E. Howard; 1820, 15 for Monroe for president, and 8 for R. Stockton and 7 for D. D. Tompkins for vice-president; 1824, 15 for Adams and Calhoun; 1828, 15 for Adams and Rush; 1832, 14 for Clay and Sargeant; 1836, 14 for Webster and Francis Granger; 1840, 14 for Harrison and Tyler; 1844, 12 for Clay and Frelinghuysen; 1848, 12 for Taylor and Fillmore; 1852, 13 for Scott and Graham; 1856, 13 for Fremont and Dayton; 1860, 13 for Lincoln and Hamlin; 1864, 12 for Lincoln and Johnson; 1868, 12 for Grant and Colfax; 1872, 13 for Grant and Wilson; 1876, 13 for Hayes and Wheeler; 1880, 13 for Garfield and Arthur.

MASSACHUSETTS AGRICULTURAL COLLEGE, at Amherst, Mass., was opened for students in 1867. Its endowment was derived from the public lands appropriated for the purpose by act of congress in 1862, and the faith of the state is pledged for its maintenance and support. The endowment is estimated at $360,000, and the annual income is $16,000. The college possesses a farm of 400 acres, on which the various buildings, embracing extensive dormitories, laboratory, chapel, professors' houses, museum, conservatories, etc., are centrally located. The real estate is valued at $200,000.

and the personal property of the farm at $6,000. The laboratory is extensive and fully equipped, and the natural history collection is very fine The library contains 2,500 volumes. Number of professors in 1880, 6; of students, 100; of alumni, 160 It is specifically an agricultural college, and not connected with any other institution. Its course of study extends over a period of four years, and the graduates receive the degree of B S. It has special courses to accommodate those who desire to pursue scientific studies related to agriculture, but are unable to spare time from the farm to take a full course The number of such, to whom certificates have been given on leaving, is 500. Every student is required to practice military tactics and drill three hours per week, and is taught the science and art of war by a government officer, who is a graduate of West Point. All students are required to labor six hours weekly on the farm, at the barn, in the orchards, vineyards, nurseries, or conservatories, for instruction in those departments, and wages are paid to those who desire to labor in order to earn the means for procuring an education There is a post-graduate course for students who desire to become candidates for the degree of PH D.

MASSACHUSETTS BAY, an indentation on the eastern coast of Massachusetts, between cape Cod and cape Ann, 70 m. long and 25 m. wide, but including in its irregular form Plymouth bay, Cape Cod bay, and several others, with numerous small islands.

MASSACHUSETTS INDIANS. The Plymouth colonists, on their settlement in Massachusetts bay, found that part of the country populated by tribes of the Algonquin family, one of the three great aboriginal races of red-men that inhabited the basin of the St. Lawrence, and a tract of country as far south as that portion settled by the Pilgrims. These tribes were five in number, the Massachusetts and Nausets, on Massachusetts bay and cape Cod; the Nipmucks, or Nipnets, who dwelt in the central part of the colony which is now the state of Massachusetts; the Pennacooks, who extended north into New Hampshire; and the Pokanokets, or Wampanoags, who occupied the south-eastern part, and whose chief was the celebrated Massasoit. The new settlers speedily entered into friendly relations with these tribes, and as early as 1644 the Mayhews of Martha's Vineyard (q.v.), and in 1646 John Eliot had undertaken missionary labors among them. See ELIOT, JOHN. These efforts bore fruit, and in 1674 there were 600 converted Indians in Plymouth colony, 1500 in Martha's Vineyard, and 1100 in the Massachusetts bay colony. But though thus successful in conversion, the settlers had not been equally so in their general relations with the Indians, and in 1675 an irritated condition which had been gradually growing among the latter, culminated in the outbreak which has become known as king Philip's war This trouble originated with Philip Metacomet, son and successor of Massasoit, under whom the Pokanokets or Wampanoags rose, and were joined by the Nipmucks, Narragansetts, and Pennacooks, until a general Indian war had ravaged all the settlements. In this situation not even the new religious faith which had been instilled into the natives acted as a preventive, and the converted Indians joined with the rest in a general onslaught upon the whites. The struggle lasted a year, and only ended with the death of Philip, Aug. 12, 1676. The Pennacooks retired northward, and the other tribes submitted; but it is on record that numbers of those who were captured were exported to the West Indies as slaves. From this time the Massachusetts Indians followed the general course of their race, dying out, or retiring before the white man, or assimilating with the latter or with the negroes In 1861 a census showed the Indian and half-breed population of the state to be 1610, of whom 306 were on Martha's Vineyard, at Christiantown and Gayhead; 438 at Mashpee and elsewhere on cape Cod; and the remainder scattered. The United States census of 1870 made return of only 150 Indians in the state of Massachusetts, so had the process of reduction, or of assimilation, progressed in nine years.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, in Boston, was founded in 1861 and went into operation in 1864. Its endowment consists of one-third part of the income derived by the state from lands appropriated for such purposes by congress in the act of 1862. It provides a series of scientific and literary studies, so arranged as to offer a liberal and practical education in preparation for active pursuits, as well as a thorough training for most of the scientific professions. The courses of a distinctively professional character are: 1. Civil and topographical engineering; 2. Mechanical engineering; 3. Mining engineering, or geology and mining; 4. Building and architecture; 5. Chemistry. Five other courses have been established, as follows: 6. Metallurgy; 7. Natural history; 8. Physics; 9. Science and literature; 10. An elective course. Each of these courses extends through four years, and for proficiency in any one of them the degree of bachelor of science is conferred. Special laboratories are provided for the instruction of women, the design being to afford them facilities for the study of chemical analysis, industrial chemistry, mineralogy, and biology. Instruction will be given to women on other subjects, also so far as suitable arrangements can be made for them. The particular course of study, which a candidate for the degree of doctor of science wishes to pursue, must be submitted to the faculty in writing, and must meet their approval. A knowledge of the Latin language is not required for admission, but strongly recommended for the better understanding of the terminology of the sciences. The school of mechanic arts affords instruction in carpentry and joinery, wood-turning, pattern-making, foundry work, iron-forging, vise-work, and machine tool work. Candidates for

a degree in physics take practical courses in microscopy, photography, lantern projections, and meteorology. The institute has 16 professors, 8 instructors, 8 assistants, and 243 graduates President, Wm. B. Rogers, LL.D.

MAS'SA DUCA'LÉ, or DI CARRA'RA, so called to distinguish it from the many towns of the same name, is a small city of northern Italy, 58 m. s.w. of Modena, and formerly capital of duchy of Massa-Carrara. Pop. 5,000. It is a bishop's see, has a public library a literary institute, a cathedral, and a ducal palace. Massa stands in a beautiful situation, sheltered by a background of mountains, and surrounded by a district productive in oranges, citrons, and vast olive-groves. In the middle ages the duchy of Massa was held by a succession of feudal lords, and passed to the house of Este, dukes of Modena, toward the close of the 18th century. Bonaparte invested his sister, the princess Eliza, with the principality of Massa and Carrara; but in 1829 it was reunited to Modena, and in 1860 became a province of the kingdom of Italy. Pop. '71, 161,994.

MASSAF'RA, a t. of the Italian province of Otranto, 11 m. n.w. of Taranto, situated in a plain in the midst of hills more productive than salubrious. Pop. 9,100. Its site is partly that of the ancient *Messapia*, from which the whole district takes its name.

MASSA'GETÆ, a nomadic people who inhabited the broad steppes on the n.e. of the Caspian sea, to the northward of the river Araxes or Jaxartes. Herodotus says that they had a community of wives; that they sacrificed and devoured their aged people; that they worshiped the sun, and offered horses to him; that they lived on the milk and flesh of their herds, and on fish; and fought on horseback and on foot with lance, bow, and double-edged axe. Cyrus is said to have lost his life in fighting against them, 530 B.C. Niebuhr and Böckh are of opinion that they belonged to the Mongolian, but Humboldt and others, to the Indo-Germanic or Aryan family.

MAS'SA LUBRE'NSE, a pleasant Italian t., 17 m. s. of Naples by sea. Pop. 3,600. Massa Lubrense stands amidst the loveliest scenery of Italy, and is built on a cliff projecting into the sea, and commanding a fine view of the bay of Naples. It dates from the early Greek period, and contains many remains of Roman antiquities. It is famed for the beauty of its women.

MASSA MARIT'TIMA, a t. in Italy, on the n.w. coast in the province of Grosseto, near the barren and unhealthy district of the Maremma; pop. 13,052. It has been a subject of dispute between the cities of Siena and Pisa, each having claims on the town, which is the seat of a bishopric formerly having its seat at Populonia, and is composed of several contiguous villages. The coast in its vicinity is traversed by a railroad.

MASSARUNI, or MAZARUNI, RIVER, in British Guiana, takes its rise in the mountains of Venezuela, lat. 4° 30′ n., long. 60° w., and flows in an extremely irregular course in a general n.e. direction until it joins the Guyuni (or Cuyuni), through which it empties into the estuary of the Essequibo river. The river has been explored for several hundred m. and is marked by a number of small islands at its mouth, and by wild scenery and bold granite cliffs in its upper course.

MASSASOIT, sachem of the Wampanoag or Pokanoket Indians. His territory at one time extended over nearly all the southern part of Massachusetts from cape Cod to Narragansett bay, and his tribe numbered 30,000, but at the time of the landing of the Pilgrims they had been reduced by disease to about 300. In 1621, Mar. 22, he visited Plymouth three months after it was founded, with 60 armed and painted warriors, for the purpose of making a friendly league with the white men. Governor Carver was so much pleased with the frank and friendly bearing of Massasoit, that on behalf of the colony he concluded a treaty of peace and mutual protection with the Wampanoags. This was sacredly kept for 50 years. Massasoit always remained friendly to the colonists. He resided in Pokanoket, or what is now the town of Bristol, R. I., where commissioners from the adjacent settlements often visited him. When Roger Williams was banished from Massachusetts, he was entertained on his way to Providence by Massasoit for several weeks. Although the English committed repeated usurpations upon his lands and liberties, he was their friend as long as he lived, imbued his people with the love of peace, and gave notice to the Pilgrims when they were in danger from other tribes. He had several sons, grandsons, and brothers. Before his death, which is supposed to have been in 1662, he had been induced to cede away at different times, nearly all his lands to the English. His two eldest sons, Wamsutta and Pometicom, or Metacomet, had English names, of which the following account is given: "After Massasoit was dead his two sons, called Wamsutta and Metacomet came to the court at Plymouth, pretending high respect for the English, and therefore desired that English names might be given them; whereupon the court there named Wamsutta, the elder brother, *Alexander*, and Metacomet, the younger brother, *Philip*." Massasoit was succeeded by his eldest son Alexander, who dying a few months after, Philip became by the order of succession head chief of the Wampanoags. These two sons, after their father's death, were regarded with much jealousy by the English, and were suspected of plotting against them; and Philip afterwards was distinguished by his wars with the English.

MASSÉ, GABRIEL, b. France, 1807; studied law and was called to the bar of Paris in 1833. He met with great success in his practice, but is best known as the author of a number of legal treatises and as editor of the *Recueil des Arrêts*. His best work, *Le*

Droit Commercial dans ses Rapports avec le Droit des Gens et le Droit Civil was printed from 1844 to 1848 and republished in 1863. In 1874 he became a member of the academy of moral and political sciences.

MASSÉNA, a t. of St. Lawrence co., N. Y., pop. '70, 2,709. situated on the Grass and Racket rivers, and bounded on the n.w. by the St. Lawrence. The township comprises Massena Center, Massena Springs and the village of Massena. The three streams furnish abundant water power, and the chief industry is the milling of flour. The portion called Massena Springs is quite popular as a watering place and has four or five hotels.

MASSENA, ANDRÉ, Duke of Rivoli, prince of Essling, and a marshal of France, was born at Nice, May 6, 1758. In his youth, he served as a ship-boy in a small vessel, and afterwards 14 years in the Sardinian army, but left it because his plebeian birth precluded him from promotion. Early in the French revolution, he joined a battalion of volunteers, and soon rose to high military rank. In Dec., 1793, he was made a general of division. He greatly distinguished himself in the campaigns in upper Italy. After Jourdan's defeat at Stockach on Mar. 25, 1799, the chief command of the army in Switzerland devolved on him in circumstances of great difficulty, but he kept his ground against the archduke Charles, and finally, by his victory over the Russians at Zürich, Sept. 25, 1799, freed France from the danger of invasion. After the battle of Marengo, Bonaparte gave him the command of the army of Italy. In 1804 he was made a marshal of the empire. In 1805 he again commanded in Italy; and subsequently he signalized himself in the terrible contest for the village of Aspern (q.v.). In 1810 he was intrusted with the chief command in Spain, and compelled the British and their allies to fall back to Lisbon; but being unable to make any impression on Wellington's strong position at Torres Vedras, he resigned his command. He offered his services, however, again, when Napoleon was preparing for the Russian campaign, but was only intrusted with the command in Provence, and in this position he remained till the restoration, when he gave in his adhesion to the Bourbons, and was made a peer. On Napoleon's return from Elba, he invited Massena to follow him, but received no response. After the second restoration, Massena retired into private life. He died April 4, 1817. Massena was one of the ablest of Napoleon's generals, but he was as extortionate as a Roman pretor. His master called him a robber, and is said to have offered him a present of 1,000,000 francs if he would give up peculation.

MASSEY, GERALD, b. in Herefordshire, 1828, of poor and illiterate parents who could give him no education. He was set to labor in a silk-mill when 8 years old, and afterwards at straw plaiting. At 15 he found employment in London as errand boy, and got hold of a few books, among them *Pilgrim's Progress*, and *Robinson Crusoe*. At 17 he was in love, and began to write verses. But his themes embraced also the sufferings of the poor, and showed deep thoughtfulness and feeling concerning the inequalities of human condition. The French revolution of 1848 awakened in his mind the desire to contribute something to the amelioration of his own class through political efforts, and in company with fellow-workmen he started a weekly reform paper under the title of the *Spirit of Freedom*. The rev. Charles Kingsley and other prominent philanthropic political agitators of that time gave their council and aid, and called public attention to the poetic faculties of Massey. He afterwards became a lecturer on Spiritualism in England, and in 1873 in the United States. The English government granted him a pension, and lord Brownlow presented him with a cottage in his native county, where he resides. His published works embrace *The Ballad of Babe Christabel and other Poems*, 1853; *Craigcrook Castle*, 1856; *Robert Burns and other Lyrics*, 1859; *Voices of Freedom and Lyrics of Love*, 1859; *Havelock's March, and other Poems*, 1861; *Shakespeare's Sonnets, never before Interpreted*, 1866; and *A Tale of Eternity, and other Poems*, 1870.

MAS'SICO, a mountain in the province of Terra di Lavaro, Naples, Italy, famous in ancient and modern times for the wines produced from its vineyards. On its southern slope is a town of the same name. It was here that Appius Claudius gained his victory over the Samnites.

MAS'SICOT, a mineral, occurring in shapeless masses of a yellow color, brittle, with earthy fracture. Chemically, it is protoxide of lead. It is used as a pigment.

MASSIE, NATHANIEL, 1763–1813; b. in Goochland co., Va.; at 17 years of age entered the revolutionary army; became a surveyor, and settled in Kentucky in 1783; removed to Manchester, Ohio, in 1790, and laid out the town of Chillicothe upon lands owned by himself; took part in the Indian wars of the northwest, gaining the rank of general of Ohio militia; was a member of the convention which framed the first constitution of Ohio in 1802; was often a member of the legislature, and served one term as speaker of the senate; was declared to have been elected governor in 1807, but resigned before entering upon office.

MASSILIA. See MARSEILLES, *ante*.

MASSILLON, a city in n.e. Ohio, on the e. bank of the Tuscarawas river, and on the Ohio canal, connecting it with lake Erie; pop. '74, 7,000. It is a junction of the Pittsburg, Fort Wayne and Chicago; the Cleveland, Tuscarawas Valley and Wheeling; and the Massillon and Cleveland division of the Cleveland, Mount Vernon and Delaware rail-

roads. It is the center of the famous coal fields of Tuscarawas valley, and has a prosperous community, engaged in farming and important industries and mining. In the vicinity are 3 quarries of white sandstone, which is largely exported. It is a shipping point for large quantities of grain, wool, butter, and beef. Its industries are represented by blast furnaces for pig-iron, rolling-mills, flour-mills, sash factories, machine shops, iron-bridge factories, paper-mills, the Russell mills for the manufacture of agricultural implements, the Massillon excelsior works, and the Massillon harvester works for the manufacture of machinery, sold extensively at the west. It has 3 newspapers, and a library for the use of members of the young men's Christian association. The first surveys for the township were made in 1826. It presents a fine appearance, being regularly built, and containing many fine residences and substantial public edifices, and is lighted by gas. It has excellent educational advantages, including a school supported by charitable people; 11 churches, 3 banks, 2 of which are national, and an opera house erected at a cost of $100,000.

MASSILLON, JEAN BAPTISTE, one of the most distinguished of modern pulpit orators, was b. at Hières, in France, June 24, 1663. His father, a notary, designed the boy for his own profession; and it was only after repeated and persistent efforts that Massillon obtained his father's permission to enter the congregation of the oratory in 1681. It was while he was engaged in teaching theology in one of the houses of the congregation in the diocese of Meaux that he made his first essay in the pulpit at Vienne. His funeral oration on M. Villars, the archbishop of Vienne, was eminently successful, and led to his being called by the superiors of the oratory to Paris, where he first had the opportunity of hearing Bourdaloue, whose style and manner, without being exactly taken by Massillon as a model, had great influence in forming the taste of the young aspirant. Like Bourdaloue, he avoided the declamatory manner and theatrical action then popular in the French pulpit; but the earnest impressiveness of his look and voice more than supplied the vigor and energy which other speakers sought from these adventitious aids. His course of ecclesiastical conferences, delivered in the seminary of St. Magloire, established his reputation. The criticism of Louis XIV., after his advent course at Versailles, that "when he heard other great preachers he felt satisfied with them, but when he heard Massillon he felt dissatisfied with himself," well expresses the characteristics of the eloquence of this great orator, who, more than any of his contemporaries, was able to lay bare the secret springs of human action, and to use the feelings and the passions of his audience as arms against themselves. He was again appointed to preach the Lent at Versailles in 1704; but although the king was again equally warm in his admiration of the preacher, Massillon was never afterwards invited to preach in the presence of this monarch; yet his funeral oration on the prince de Conti, in 1709, was one of the greatest triumphs of his oratory. Soon after the death of Louis XIV., Massillon, in 1717, was named bishop of Clermont, and in the same year was appointed to preach before the young king Louis XV., for which occasion he composed his celebrated *petit carême*—a series of ten sermons. It was not till 1719 that he was consecrated bishop of Clermont, in which year also he was elected a member of the academy; and in 1723 he preached the funeral oration of the duchess of Orleans, his last public discourse in Paris. From this time he lived almost entirely for his diocese, where his charity, gentleness, and amiable disposition gained him the affections of all. He died of apoplexy in 1742 at the age of 79 years. His works, consisting mainly of sermons and other similar compositions, were collected in 12 vols., by his nephew, and published in 1745–46; later editions are those of Beaucé (4 vols. 1817), Mequignon (15 vols. 1818), and Chalandre (3 vols. 1847).

MASSINGBERD, FRANCIS CHARLES, 1800–72, b. in Lincolnshire, England, and educated at Magdalen college, Oxford. After graduating with high honors he entered the church and became rector of South Ormsby in his native county (1825). In the Lincoln cathedral he was made a prebendary in 1847, and in 1862 chancellor. In addition to many papers and discussions on ecclesiastical subjects he was the author of *Church Reform* (1837), *History of the English Reformation*, *Law of Church and State*, and *Lectures on the Prayer Book* (1864).

MASSINGER, PHILIP, an English dramatist, was b. in 1584 at or near Wilton, it is supposed, the seat of the earls of Pembroke, of which family his father was a retainer. Of his boyish days, and of the place of his education, nothing is known. From his plays we are, however, certified that he was a classical scholar. He entered St. Alban's hall as a commoner in 1602, and quitted the university suddenly, and without obtaining a degree, on the occasion, it is surmised, of his father's death. After leaving Oxford his career cannot be clearly traced. He came to London, and wrote for the stage, sometimes on his own account, frequently—as was the fashion of the time—in conjunction with others. He produced many plays, the dates of which are obscure. He seems to have lived in straitened circumstances, and to have been of a melancholy turn of mind. On the morning of Mar. 16, 1640, he was found dead in his bed. He was buried in the church-yard of St. Saviour's by the hands of the actors. In the parish register stands the pathetic entry: "March 20, 1639–1640, buried Philip Massinger, a stranger."

Taken as wholes, Massinger's plays do not strike one much; their merits consist in detached passages. He was of a grave and serious mood, and his reflective passages rise into a rich elaborate music. His finest writing is contained in *The Virgin Martyr*, but his

best plays are *The City Madam* and the *New Way to Pay Old Debts*—the last of which has even yet some slight hold on the stage. The best edition of his works is that by Gifford (Lond. 1805, reprinted 1815).

MASSINISSA. See MASINISSA.

MASSON, DAVID, b. Aberdeen, Scotland, 1822; educated at Marischal college, Aberdeen, and the university of Edinburgh, became editor of a Scottish provincial paper at the age of nineteen: went to London in 1844, remained a year, contributing to *Fraser's Magazine* and other periodicals. For two or three years he was in Edinburgh, writing for periodicals. In 1847 he returned to London where he remained 18 years, and while there was chosen professor of the English language and literature at the University college, London. He retired from this post in Oct., 1865, having been appointed professor of rhetoric and English literature in the university of Edinburgh. He contributed numerous articles to the *Quarterly*, *British Quarterly*, and the *North British Review*, to the *Encyclopædia Britannica*, and the *English Cyclopædia*, and in 1859–68, was the editor of *Macmillan's Magazine*. To this he contributed numerous articles. His best-known papers are on *Carlyle's Latter-Day Pamphlets; Dickens and Thackeray; Rabelais; Literature and the Labor Question; Pre-Raphaelism in Art and Literature; Theories of Poetry; Shakespeare and Goethe; Hugh Miller; De Quincey and Prose-writing.* He has published *Essays, Biographical and Critical, chiefly on English Poets; Life of John Milton; British Novelists and their Styles; Recent British Philosophy, a Review with Criticism, including some Remarks on Mr. Mill's Answer to Sir W. Hamilton; Chatterton: a Story of the year* 1770; *Essays on Wordsworth, Shelley, Keats.* In 1873 he published a biography of the poet Drummond, entitled, *Drummond of Hawthornden: the Story of his Life and Writings; The Three Devils—Luther's, Milton's, and Goethe's.* His life of Milton is of high authority.

MASSO'RAH, variously derived from *massar* (to hand down to posterity—tradition), and *assar* (to bind, to fix within strict limits), denotes chiefly a certain collection of critical notes on the text of the Old Testament, its divisions, accents, vowels, grammatical forms, letters, etc.; all the more necessary for the more accurate preservation of the sacred documents, as, according to the early mode of Shemitic writing, only the consonants, and these without any stop or break, were put down; a proceeding which, in the course of time, must naturally have produced a vast number of variants, or rather different ways of reading and interpreting the same letters, by dividing them into different words with different vowels and accents. The origin of the Massorah, which, by fixing an immutable reading upon each verse, word, and letter, put an end to the exercise of unbounded individual fancy—which, for homiletical purposes alone, was henceforth free to take its own views—is shrouded in deep mystery. The first traces of it are found in certain Halachistic works treating of the synagogue rolls of the Pentateuch, and the mode of writing them. Some of the earliest works on the subject have survived in their titles only, such as *The Book of the Crowns, The Book of the Sounds*, etc., attributed to the Soferim, or masters of the Mishna (q.v.). There can hardly be a doubt that the Massorah, like the Halacha and Haggada, was the work, not of one age or century, but of many ages and centuries, as, indeed, we find in ancient authorities mention made of different systems of accentuation used in Tiberias, Babylon (Assyria), and Palestine. It was in Tiberias also that the Massorah was first committed to writing, between the 6th and 9th centuries A.D. Monographs, memorial verses, finally glosses on the margins of the text, seem to have been the earliest forms of the written Massorah, which gradually expanded into one of the most elaborate and minute systems, laid down in the "Great Massorah" (about the 11th c.), whence an extract was made known under the name of the "Small Massorah." A further distinction is made between Massorah *textualis* and *finalis*, the former containing all the marginal notes; the latter, larger annotations, which, for want of space, had to be placed at the end of the paragraph. The final arrangement of the Massorah, which was first printed in Bomberg's Rabbinical Bible (Ven. 1525), is due to Jacob ben Chajim of Tunis, and to Felix Pratensis. The language of the Massorah is Chaldee, and besides the difficulty of this idiom, the obscure abbreviations, contractions, symbolical signs, etc., with which the work abounds render its study exceedingly hard. Nor are all its dicta of the same sterling value; they are not only sometimes utterly superfluous but downright erroneous. Of its "countings," we may adduce that it enumerates in the Pentateuch 18 greater and 43 smaller portions, 1534 verses, 63,467 words, 70,100 letters, etc.—a calculation which is, however, to a certain degree at variance with the Talmud. An explanation of the Massorah is found in Elijah Levita's (q.v.) *Masoreth Hammesoreth* (transl. into German by Semler, Halle, 1772), and Buxtorf's *Tiberias* (1620), a work abounding with exceedingly curious information on the text of the Old Testament.

MAS'SOWAH, or MASOUA, an islet and t. on the w. coast of the Red Sea, in lat. 15° 36′ n., and long. 39° 21′ e., close to the boundary between Nubia and Abyssinia. At present it is politically connected with Nubia rather than with Abyssinia, being in the possession of the viceroy of Egypt, and ruled by a governor appointed by him. The island is of coral, the soil partly formed from the rock, partly from sand and broken shells. It is only about a mile and a quarter in circumference, and is distant from the main-land only about 200 yards. It is almost wholly occupied by the town, and contains

a pop. of about 8,000, mostly Arabs. The Abyssinian coast is very destitute of harbors, and Massowah is of great importance as a seat of commerce. It carries on a large trade by sea with Bombay and with the Arabian coast, particularly with Jiddah and Yembo; and a large trade also by caravans with Cairo on the one hand, and with Gondar and the whole interior of Abyssinia on the other. Caravans start at all seasons for Cairo and for Gondar; but most numerously in January, at the end of the rains, and in June, before the swelling of the waters. Wheat, rice, maize, durra, salt, tobacco, gunpowder, sugar, cotton and silk goods, scarlet cloth, glass-wares, arms, and hardwares are among the principal imports from the more distant parts of the world. From Abyssinia and the coasts of the Red Sea, Massowah receives and exports ivory, rhinoceros horns, wax, ostrich-feathers, tortoise-shell, myrrh, senna, pearls, etc. Massowah has all the worst characteristics of an oriental town. Its streets are mere lanes, and excessively dirty. Massowah was originally chosen as the place of debarkation of the British expedition to Abyssinia (1867), and the starting-point of its operations; but it was soon found unsuitable, and Annesley bay, about 15 m. further to the south—the deepest inlet on the Abyssinian coast—was chosen for that purpose instead.

MAST, an upright or nearly upright spar, resting on the keelson (q.v.) of a ship, and rising through the decks to a considerable height, for the purpose of sustaining the yards on which the sails are spread to the wind. It is usually in joints or lengths, one above the other, the lowest and strongest being the *mast* proper, distinguished by its position as the fore, main, or mizzen mast. Above this come successively the *top-mast*, the *top-gallant-mast*, the *royal-mast*, and—though very rarely used—the *sky-scraper*. The full height of all the masts together, in a first-rate ship of war, was about 250 feet. As when a strong wind is blowing, the pressure upon the canvas carried by a mast amounts to many tons, the mast itself must be of great strength. In some modern vessels hollow iron masts are used, with great success, as being much lighter than those of wood; but the majority are of Norway fir of the best quality. In small vessels the mast is made of one tree; but it is considered stronger when "a made mast," that is, when constructed of several pieces riveted together, and strengthened by iron hoops. The mast is sustained, when fixed, by the shrouds, as supports on each side, by the stay (q.v.) in front, and the back-stays behind. See MASTS.

MASTER, in the royal navy, was an officer ranking with, but junior to, lieuts., and charged with the details of sailing the vessel, under the general orders of the capt. In recent years the title has been changed to "navigating lieut.:" the change of name carrying, in several particulars, an improved status. It is his duty to take charge of such of the ship's stores as are not under the pay-master; in short, he is the navigator and storekeeper for the vessel; as such, holding a most responsible and onerous position. For his assistants, he has the junior officers in his own department—the navigating sub-lieuts., navigating midshipmen, and navigating cadets—and the ship's quartermasters. The full pay of a navigating lieut., exclusive of store and other allowances, ranges from 12s. to 22s. a day; of a navigating sub-lieut., from 5s. to 7s. 6d.; and of a navigating midshipman, from 3s. to 4s. a day: while as alpha and omega, the staff-captain has 22s. a day; and the navigating cadet, 1s. a day (which is, of course, meant merely for pocket-money).

In the merchant navy, the master of a vessel, usually by courtesy denominated the captain, is the officer commanding her. His duties comprise the maintenance of discipline, the sailing of the ship, the charge of her cargo, and many other mercantile functions. His responsibilities to the ship's owners are of course settled by distinct agreement, applicable to the special case. Towards the public, however, many acts of parliament determine his responsibility. The master is bound to come to a written agreement with each of his men, before sailing, as to the wages to be paid. He is bound to bring home and subsist (to the number of 4 for every 10 tons), seafaring persons—British subjects—who may have been cast away, captured by the enemy, or by other unavoidable accident left upon a foreign shore; for these he is granted head-money by the admiralty. The master is compelled to keep a proper log-book, and must produce it, with his ship's papers, on the requisition of the commander of a ship-of-war of his own nation. Masters of vessels of a certain size are required to obtain certificates of qualification from the board of trade. Certificated masters are eligible for the ROYAL NAVAL RESERVE (q.v.), with the rank of lieutenant.

MASTER (Ger. *meister*, Lat. *magister*, from *magis*), one who rules, governs, has servants under him. As a complimentary appellation of respect, it is prefixed to the Christian name and surname, or surname simply, contracted into Mr. in writing, and pronounced "Mister." The eldest son of a baron in the peerage of Scotland is generally known by the title of the "master of——," prefixed to his father's title of peerage.

MASTER-AT-ARMS is a petty officer on board a ship-of-war, charged with the care and instruction in the use of small arms, except as regards the marines. He is also employed in maintaining discipline, order, and cleanliness among the crew. His assistants in his duties are the "ship's corporals."

MASTER OF ARTS (abbreviated M.A., and sometimes, particularly in Scotland, A.M.,) is a degree conferred by universities or colleges. In the universities of England,

this title follows that of bachelor (q.v.). It is the highest in the faculty of arts, but subordinate to that of bachelor of divinity. A master becomes a regent shortly after obtaining his degree, and thereby obtains the privilege of voting in congregation or convocation at Oxford, and in the senate at Cambridge; and in the Scotch universities, of becoming a member of the general council. See DEGREE.

MASTER OF THE BUCKHOUNDS, an officer in the master of the horse's department of the royal household, who has the control of all matters relating to the royal hunts. A salary of £1500 is attached to the office, which is regarded as one of considerable political importance. The master of the buckhounds goes out of office on a change of ministry.

MASTER OF THE CEREMONIES, an office instituted at the court of England in 1603, for the more honorable reception of ambassadors and persons of distinction. The same term was afterwards extended beyond the court, by being applied first to Beau Nash, the famous "master of the ceremonies," or president of the amusements at Bath, and then to other persons exercising the same function in ordinary assemblies.

MASTER OF COURT is the title given in England to the chief officers under the judges, their duty being to attend the sittings of the courts during term, and make minutes of their proceedings. They also tax all the bills of costs of the parties arising out of the suits and matters before the courts. They are appointed by the chief judge of the court, and hold their offices for life during good-behavior. Masters in chancery were similar officers in the court of chancery, but were abolished, and the duties are now performed partly by the judge, and partly by the registrars.

MASTER OF THE GREAT WARDROBE, an officer at the court of England, who had, in former times, the superintendence of the royal wardrobe. The office existed from a very early period down to 1782, and was considered a position of great honor. Its duties are now transferred to the lord chamberlain.

MASTER OF THE HORSE, the third great officer of the court, who has the superintendence of the royal stables, and of all horses and breeds of horses belonging to the queen. He exercises authority over all the equerries and pages, grooms, coachmen, saddlers, and farriers, and has the appointment and control of all artificers working for the queen's stables. He is answerable for the disbursement of all revenues appropriated to defray the expenses of his department; but his accounts are audited and examined by the board of green cloth. He has the privilege of making use of the royal horses, pages, and servants, and rides next to her majesty on all state occasions. The office is one of great antiquity, and is considered to be a position of great honor. The master of the horse is appointed during pleasure, by letters-patent; but his tenure of office depends on the existence of the political party in power. The salary is £2,500 a year.

MASTER OF THE HOUSEHOLD, an officer in the lord steward's department of the royal household, whose specific duties consist in superintending the selection, qualification, and conduct of the household servants. He is under the treasurer, and examines a portion of the accounts. The appointment is during pleasure, and is not dependent on political party. The salary is above £1100 per annum.

MASTER IN CHANCERY, an officer of a chancery court, appointed to assist the chancellor. His duties, in general, are prescribed by statute. It is a common practice to refer causes to a master for hearing, particularly causes involving intricate accounts, and requiring computations. A master is often appointed to examine witnesses, to take depositions, to inquire into and report the facts of a case, to make settlements under deeds, to discharge special acts under the direction and in behalf of the court, etc. Masters in chancery were formerly clerks in chancery, 12 in number, with the master of the rolls at their head. They were at first called *preceptores*, and were not called masters, till the time of Edward III. The office has been abolished in England, where the duties formerly belonging to masters are discharged by judges or registrars. In most of the United States the office still exists, with the duties already described annexed to it, subject to statutory modification in the various states. In some states, officers with the same functions as masters in chancery, are called commissioners.

MASTER OF THE ROLLS, the president of the chancery division of the high court of justice in England, and in rank next to the lord chief-justice of England, and the lord chancellor. He was an ancient officer of the court, and was formerly the chief of the masters in chancery. He is the only superior judge in England who can now be elected to represent a constituency in the house of commons. The master of the rolls had originally the custody of the rolls or records; in the course of time this charge became merely nominal, the custody having vested in officers not in his appointment or control; an anomaly which was remedied by 1 and 2 Vict. c. 94, which restored the custody to him with extensive powers. The salary is £6,000 a year.

MASTER AND SERVANT. The relation of master and servant is constituted in Great Britain entirely by contract; for there being no status of slavery recognized in law, one person can only serve another with his or her own free consent. Being a mere contract, it may, like other contracts, be broken at will, subject only to the usual consequence that the party in the wrong is liable to pay damages for the breach. In England and Ireland the engagement or hiring of a servant may be either verbal or in writing; but if

the engagement is for more than one year, it must be in writing. If for an indefinite time, no writing is necessary. When a servant continues in the service after the first year, a renewal of the contract is presumed on the same terms. Sometimes it is difficult to say whether an engagement of an indefinite kind is by the year, or by the month or week; in such cases a material fact is how the wages were to be paid, for if they are paid weekly, the presumption will be that the hiring was by the week, unless there are other circumstances to show that a yearly hiring was meant. The difference between a yearly contract and a weekly one is that if the servant is discharged without cause during the year, he is entitled to wages up to the end of the year; and on the other hand, if he leave without cause during the service, he is entitled to no wages at all.

A servant undertakes to have competent skill for the duties of the service, and is bound to use due diligence, and to conduct himself respectfully. He is bound to obey all lawful orders of his master during the engagement, if they are within the scope of the particular service for which he was engaged. Thus, a coachman is not bound to do the duties of a cook, and *vice versa*. Every servant is bound to take due care of his master's property, and he is liable to an action at the suit of his master for gross negligence, and also for fraud and misfeasance. A master is not entitled to chastise a servant, whatever the age of the servant may be, though, in the case of an apprentice under age, a moderate chastisement is justifiable. The grounds on which a servant may be lawfully discharged are willful disobedience, gross immorality, habitual negligence, and incompetence. If any person entice away a servant, and thereby cause loss to the master, the latter may sue such person for the injury. If the servant is a female, and is seduced, and thereby is unable to continue her service, the master may also bring an action against the seducer for any loss of service caused thereby; and on the same principle a master may bring an action against a third party who causes personal injury to the servant. In the case of the bankruptcy of the master, a preference is given to the servant's wages if due and unpaid, but this extends only to two months' wages, and the servant is an ordinary creditor for the balance beyond that sum. The death of the master is a discharge of the contract; and in many cases the servant is not entitled to recover wages for the time actually served, though there is an exception as to domestic servants. If a servant is rightfully discharged he is not entitled to wages for the broken time since the previous periodical payment of wages; and so in the case of the servant's death during the currency of the term, the servant's executors cannot recover payment for the broken time; but it is otherwise in the case of domestic servants. When a servant falls sick the master is not bound to provide medical attendance whether the servant lives under his roof or not; but as in such cases a doctor is often sent for by the master without any express understanding between the parties, the master is frequently made liable on the ground that the doctor was sent for by and gave credit to the master. As a general rule, the servant takes the risk of all the ordinary accidents attending the particular service; and if he suffer from an accident met with in the course of the service, the master is not liable for the consequences, unless there was some personal negligence on his part. Thus, it often happens that servants are engaged in a manufactory or building where machinery is used and accidents frequently occur. Another case often occurs where two or three servants of the same master are engaged together, and one servant is injured by the negligence of another. In such a case the rule is that the injured servant can sue the master, except where the servants at the time were engaged in a common operation, for in the latter case the servants are or ought to be a check on each other. In cases where a servant injures a third party, the rule is that the master is liable, provided the servant at the time was acting in the ordinary course of his duty, and within the scope of the master's orders, expressed or implied. Hence, if a coachman carelessly run down a person on the highway, or do injury to another, the master is liable; but if the coachman was driving the master's carriage without or contrary to the orders of the master, the servant alone is liable. So the master is not in any way responsible for the crimes or criminal offenses committed by his servant; yet sometimes he is involved in fines. The above are the general rules as regards servants generally; but in England there is a distinction in many instances observed between domestic servants and other servants. The leading distinction is that if nothing is said as to the length of service, it is presumed that the service can be terminated at any time, on giving a month's notice on either side, or in case of the discharge of a domestic servant without notice, then on payment of a month's wages. It is often popularly thought that a domestic servant cannot be turned out of the master's house at a moment's notice, even on paying a month's wages, but this can always be done with or without cause. In case of discharge without cause, the servant is entitled to a month's wages, but not board wages; she also gets wages only up to the master's death. He is not compelled to give a character to the servant; it is entirely optional; but if he does so, then it must be a true one, otherwise an action will lie for defamation. But if a master without malice, and acting *bona fide*, gives an untrue character, he is not liable, for the communication is held to be privileged. If a master knowingly give a false character to a servant who is engaged by a third party on the faith of it, and robs such third party, the latter can sue the former master for the damages. Persons personating masters, and giving false characters, and servants using such false characters, are liable to be summarily convicted, and fined £20.

In general, a servant, if he refuse to enter the service, or leave it without cause, is

merely liable to an action of damages for breach of contract, which is no remedy at all, as few servants are worth the expense of a suit. As this conduct, however, might often cause great hardship to masters, especially where they are employed in trade or manufactures, statutes have been passed which give a power to justices of the peace to compel the servant to remain in the service until he give the legal notice to leave. This was formerly done by punishing the servant who left the service without just cause by imprisonment. This law, complained of by workmen as one-sided, was modified by the employers and workmen act (1875), which gives county courts enlarged powers in regard to payment of money, rescission of contract, and taking of security as between employers and workmen; and by the conspiracy act (1875), which, while deciding that in trade disputes no combination shall be indictable if the act contemplated done by one person would not be so, makes special criminal provision in case of persons employed by gas and water companies.

In *Scotland* the law as to master and servant differs from the above in several particulars, of which the following are the most important. With regard to domestic servants, in towns, if nothing is said, then the hiring is for half a year, and cannot be put an end to without 40 days' warning before the end of the half year; and if the servant is dismissed without just cause, he or she can claim not only wages but board-wages till the end of the term. In case of the master's death the servant can claim wages for the whole of the current term, but is bound in that case to serve the executors, or look out for another situation. In case of the master's bankruptcy the servant is a privileged debtor for the wages of the current term. In most other respects the law as to servants is the same as in England. The statutes enabling justices of the peace to imprison defaulting workmen and artificers have been modified.

MASTER AND SERVANT. [*From Supplement.*] The act 30 and 31 Vict. c. 141, called the master and servant act, 1867, having caused profound dissatisfaction among workmen, a royal commission was appointed to investigate and report. The first two sections were found to be objectionable because they conferred a power to inflict simple imprisonment as the penalty for breaking a purely civil contract. The 14th section was found to be equally open to objection, as it authorized imprisonment for three months, with hard labor, in cases of an exaggerated character. Upon the above report are based the existing acts—the employers and workmen's act (38 and 39 Vict. c. 90) and the conspiracy and protection of property act (id. c. 86)—which repeal that of 1867, and came into force on Sept. 1, 1875. The first act, which is divided into five parts, empowers county courts, in respect of disputes between employers and workmen, to make orders of payment of money; to set off one claim against another, whether liquidated or unliquidated; to rescind any contract, and to accept in room of damages security for so much of the contract as remains unperformed. A court of summary jurisdiction may exercise all the powers as above when the sum in dispute is under £10. Disputes between master and apprentice may also here be tried as to indentures or contracts. The term "workman" in this act does not include a domestic or menial servant, but any person engaged in manual labor, under or above 21 years of age, who has entered into or works under a contract for his employer. It does not apply to seamen or apprentices to the sea service. The second or conspiracy act, in relation to trade disputes, declares that in an agreement or combination of two or more persons they cannot be indicted for conspiracy to do that which if done by any one singly would not be punishable as a crime. This does not exempt from punishment any conspiracy punishable by act of parliament, nor alter the law as to riot or unlawful assembly. But crime under this section is defined as an offense punishable either on indictment or summarily, by imprisonment, either absolutely, or as an alternative for some other punishment. The imprisonment is limited to three months. Workmen breaking a contract in connection with the supply of gas or water are liable to conviction either summarily or on indictment, and the offense is punishable by a fine of £20, or imprisonment for three months, with or without hard labor. Willful breach of contract or of hiring, with the probable consequences of danger to human life, incurs a penalty of £20, or imprisonment for three months with or without hard labor. Should a master who is legally liable to provide food, clothing, etc., for a servant or apprentice neglect to do so, he incurs a penalty not exceeding £20. The offender may object to be tried and may be indicted. The parties, and their husbands and wives, are competent witnesses. In Scotland proceedings may be on indictment either in justiciary or sheriff court.

MASTER AND SERVANT (*ante*). In the United States the common-law rules governing this relation have been modified by statutory enactment in a very slight degree only. The law of contracts almost always governs without being restrained by legislation arising from class distinctions or rank. The principles of common law apply in this country more completely than in England, where there are many special statutes on the subject. The terms master and servant are used in more than one sense, and may indicate a relation of service in fact, or such a relation existing only by construction of the law. As applied to domestic service and apprenticeship there is little of importance to be said. The latter relation is now not very common in this country, and the legal principles applicable have long since been well settled. When the words are used in a broader sense the relation indicated is often very like that of principal and agent, and

the general laws of agency apply. The law of this country recognizes no distinction between the hiring or liability of domestic or agricultural servants and others. In the contract there must be mutual engagements, but they need not necessarily be co-extensive. Thus the servant may agree to serve for a year without binding the hirer to retain him for the whole of that period. The contract of service comes under the statute of frauds, and should, therefore, be in writing if for more than one year. If the contract be "entire," that is, for the whole of a definite period, the servant cannot recover unless he serves for the whole time. The master may dismiss for refractory or immoral conduct, and can sue his servant for damages incurred by refusal to perform his duties. On the other hand, if after contract made the master refuse to furnish work, the servant may sue for the whole amount of his wages if he present himself at the proper time in readiness to perform. Thus an opera singer may sue a manager for full contract salary, though the singer may never have been allowed to sing a note. The liability of the master to his servants for damages incurred from one another while in his employment can be based only on neglect by him to furnish proper tools or the willful hiring of incompetent persons. But it has been held, in *Davis* vs. *Detroit R.R. Co.*, 20 Mich., 105, that though a servant was injured by the negligence of a very incompetent fellow-servant, yet he could not recover because, being aware of the incompetence, he voluntarily took the risk. See also 3 Cushing, 270, and 20 Barber (N.Y.), 449. But if the service is of its very nature dangerous, and the servant undertakes it knowingly, he can have no remedy for injuries. More important are the distinctions as regards the liability of the master to third persons for the acts of his servant. The principle which governs is based upon the control or non-control of the latter by the former. The general rule is that the master is liable for all tortuous acts done by a servant when in his service and acting within the scope of his proper employment. A general contractor, however, is not under the control of his employer; and, therefore, the latter is not liable for his acts. But in the case of corporations and particularly in railroad cases the courts of the several states have, from motives of public policy, seen fit to consider the corporation as in fact itself present in the persons of its servants. Again, it was formerly held that a master could not be liable for the willfully wrongful act of his employee, when not acting under direct authority; but in 38 Miss., 242, a railroad was held responsible for the willful and wanton act of an engineer; and the tendency of modern cases is strongly towards enlarging the limits of the doctrine of *respondeat superior* as applied to great corporations which assume extraordinary powers and hold human life and immense property interests in their hands. But notice of want of authority in servants by the superior officers of a railroad will relieve them of liability for the acts of such servants. In 14 Howard, 468, it was held that it made no difference that an inferior disobeyed orders of a superior, provided that he was acting strictly within the scope of his own employment, and the company was held liable. The relations of employer and employed in the railway system have been productive of the most important discussions and decisions as regards the law of master and servant which have arisen in this country. See *Redfield on Railways.*

MASTER SINGERS. See MINNESINGERS, *ante.*

MASTERWORT, *Peucedanum ostruthium.*, a perennial plant of the natural order *umbelliferæ*, having a stem from 1 ft. to 2 ft. high, broad bi-ternate leaves, large flat umbels of whitish flowers, and flat, orbicular, broadly margined fruit. It is a native of the n. of Europe and the n. of America, and is found in moist pastures in some parts of Britain, but apparently naturalized rather than indigenous, its root having formerly been much cultivated as a pot-herb, and held in great repute as a stomachic, sudorific, diuretic, etc.; its virtues being reckoned so many and great that it was called *divinum remedium.* It still retains a place in the medical practice of some countries of Europe, although, probably, it is nothing more than an aromatic stimulant. The root has a pungent taste, causes a flow of saliva, and a sensation of warmth in the mouth, and often affords relief in toothache.

MASTIC, a species of gum-resin yielded by the mastic or lentisk tree (*pistacia lentiscus*, natural order *terebinthaceæ*). It oozes from cuts made in the bark, and hardens on the stem in small round tear-like lumps of a straw-color, or if not collected in time, it falls on the ground; in the latter state it acquires some impurities, and is consequently less valuable. The chief use of this gum-resin is in making the almost colorless varnish for varnishing prints, maps, drawings, etc. It is also used by dentists for stopping hollow teeth, and was formerly used in medicine. It is imported in small quantities, chiefly from the Morocco coast, but some is occasionally brought from the s. of Europe. The name of mastic is also given to oleaginous cements, composed of about 7 parts of litharge and 93 of burned clay, reduced to fine powder, made into a paste with linseed oil.

MASTIFF, a kind of dog, of which one variety has been known from ancient times as peculiarly English, and another is found in Thibet. No kind of domestic dog has more appearance of being a distinct species than this, and it shows little inclination to mix with other races, although the English mastiff has been in part crossed with the staghound and blood-hound. The ENGLISH MASTIFF is large and powerful, with a large head, broad muzzle, large, thick, pendulous lips, hanging ears of moderate size, smooth hair, and a full but not bushy tail. It is generally from 25 to 28 in. high at the shoulder,

but a still greater size is sometimes attained. The mastiff is very courageous, and does not flee even from the lion, for which three or four of these dogs are said to be a match. The Gauls trained British mastiffs and employed them in their wars. The mastiff is now chiefly valued as a watch-dog, for which no dog excels it; and whilst it faithfully protects the property intrusted to it, it has the additional merit of refraining from the infliction of personal injury on the invader. It becomes much attached to its master, although not very demonstratively affectionate; it is excelled by many kinds of dog in sagacity. The English mastiff is usually of some shade of buff color, with dark muzzle and ears. The ancient English breed was brindled yellow and black. The MASTIFF OF THIBET is still larger than the English; the head is more elevated at the back; the skin from the eyebrow, forms a fold which descends on the hanging lip; the hair is very rough, and the tail bushy; the color mostly a deep black.

MASTODON, a genus of fossil proboscidian pachyderms, nearly allied to the elephant, but with simpler grinding teeth, adapted for bruising coarser vegetable substances, or perhaps fitted for an animal of more omnivorous character than its modern representative. The teeth were roughly mammillated, hence the name, meaning teat-tooth. Eleven or twelve species have been described from the miocene, pleiocene, and pleistocene strata in Europe, Asia, and America.

MASTODON (*ante*). The mastodons are distinguished from the elephants principally by their dentition. As in the elephants, the upper incisors grew from permanent pulps and constituted the tusks. In most cases, moreover, the mastodons have lower incisors, and these often formed short tusks, which, however, usually disappeared in the adult. But the more important distinction is found in the molar teeth, which are more numerous in the mastodon, and have nipple-shaped tubercles. These tubercles are in rows, the number of which varies in different species. For this reason Dr. Falconer divided the mastodons into two principal sections, *trilophodon* and *tetralophodon*. In trilophodon are *mastodon giganteus*, of the post-pliocene of North America; *M. tapiroides* and *M. angustidens* of the miocene, in which there are three rows of tubercles. In tetralophodon are *M. latidens* and *M. longirostris* of the miocene, and *M. arvernensis* of the pliocene, in which the molars have four rows of tubercles. In *M. sivalensis* from the upper miocene of India the molar teeth have five rows, and the last six rows of tubercles. For this Dr. Falconer proposed the name of *pentalophodon*. The distribution in time of the mastodon differs in the two hemispheres. In Asia and Europe the genus commenced in the miocene and became extinct in the pliocene. In America no fossils of them have been found previous to the pliocene, but they continued to the end of the post-pliocene period. The *mastodon giganteus* of North America ranged from Canada to Texas. The most complete skeleton perhaps which has been found was discovered in 1845 at Newburg, Orange co., N. Y., in a swamp usually covered with water, and described by Dr. J. C. Warren, of Boston, in which city the skeleton now stands. In this specimen the cranium is flatter than in the elephant, narrow between the temporal fossæ, the face becoming much wider below the nasal opening. The temporal fossæ are very large, indicating great power in the muscles of the jaws. The cervical vertebræ have short spinous processes, except the last, which is 6½ inches. The spinous process of the third dorsal vertebra is 23½ in. long, the others gradually becoming less, the last being 4 inches. The first lumbar vertebra measures, across the transverse processes, 17 in., the body measuring 5 inches. The sacrum consists of five bones and is 20 in. in length on the lower surface. The caudal bones probably numbered about 22, and were very strong at the commencement of the tail. There are 20 ribs, 13 true, and 7 false or floating. The first one is 28 in., and the ninth, the longest, 54½ in. long; the last is 21 inches. The shoulder-blade is more nearly equilateral than in the elephant, and the glenoid cavity, for the reception of the head of the humerus, is 11 by 5 inches. The humerus is 39 in. in length and the same in its largest circumference. The circumference of the elbow joint is 44 inches. The radius is 29 in. long and 6½ in. wide at the lower end; the ulna larger and 34 in. long. The fore foot is nearly 2 ft. broad. The thigh-bone, about the length of the humerus, is 17 in. in circumference at the middle and 30 in. at the lower end; the knee-pan is nearly globular; tibia 28 in. long, 30 in. in circumference at the upper end where it articulates with the thigh-bone, and 13¼ in. at the middle. The skeleton is 11 ft. in height and 17 ft. long from end of face to commencement of tail, which is 6 ft. 8 in. long. The circumference of the skeleton around the ribs is 16 ft. 5 in., and the tusks are 11 ft. long, 8 ft. 8 in. projecting beyond the sockets. About 30 species of mastodon are described by Dr. Warren in his work *The Mastodon Giganteus of North America*, 2d ed. 4to, Boston, 1855. A species similar to the *giganteus* existed during the same time in South America, also species belonging to the European type.

MASTODONSAU'RUS. See LABYRINTHODON, *ante*.

MASTS, IRON AND STEEL. As far back as 1838, the city of Dublin steam-packet company had a steamer with hollow iron masts, the masts acting also as ventilating funnels for the cabins. From that time, iron has been frequently employed for lower masts, in sailing-ships as well as in steamers. The plan has usually been to make them of plates bent to the proper curvature, jointed by internal strips, and strengthened by an internal cross flange of plates secured by angle-irons; but sometimes the plates are lapped. The plates vary from ⅜ to ⅝ in. in thickness. Mr. Grantham (*Iron-shipbuilding*) states that

iron masts are 'lighter and stronger than timber masts; and when compared with the built-up masts of large vessels, are rather less expensive. For vessels of the same tonnage, the difference of weight is nearly two to three in favor of iron.

Iron is used for yards as well as masts. An iron yard was made in 1847 for the Australian clipper-ship *Schomberg*, 112 feet long, and varying in diameter from 14 to 28 in.; it weighed 7½ tons. It was calculated that a timber yard of the same size would weigh 12½ tons. Iron masts have since that time been employed in many ships in the royal navy, made of three vertical ranges of plates bent to the required curvature, with butt joints, and riveted to three T-irons which cover the joints on the inside.

Capt. Cowper Coles (drowned in the *Captain*, a martyr to his own inventiveness, 1870), the inventor of the turret system for ships of war, introduced tripod iron masts. The real mast is strengthened and upheld by two others, the three forming a tripod. The central tube, or real mast, is carried up to form the topmast; while the side tubes are carried up only to the height of the lower yard. The main tube rests upon the keelson; while the side tubes, which are on either side of it and behind it, rest upon parts of the bottom-framing; but all three are fastened to the deck as they pass through. The lower mast only forms the tripod, and is self-supporting, without shrouds, etc.; the topmast is secured with stays, backstays, and out-riggers. Capt. Coles enumerated many advantages which he believed this construction to possess.

Since the use of steel in shipbuilding has become recognized, the employment of the same metal for masts has engaged attention: steel plates, we know, can now be made almost as easily as plates of iron; and it becomes a question of increased efficiency against increased cost as to which metal shall be adopted. Steel being a stronger metal than iron, masts of equal strength would weigh less if constructed of the former than of the latter metal. The hitherto not altogether unfounded distrust felt towards steel in the present state of its manufacture, has prevented its adoption from making such rapid progress as it was once thought it would. Actual use in war and in stormy weather will be necessary, however to determine all the relative advantages of iron and steel for masts.

The subject of the stability of iron masts is treated with much fullness by Mr. Lamport, in a paper read before the Institute of Naval Architects in 1863.

MASUDI, or AL MASUDI (ABUL HASAN ALI BEN HUSEIN BEN ALI), b. Baghdad, 9th c. descended from the great family of the Abdallah-ben-Masud, one of whose members had attended Mohammed, on his flight to Medina. Masudi early devoted himself to profound studies, to which he added by prolonged travels in Spain, Russia, and throughout the east. In the year 303, of the hegira, he was in China, where Arabic colonies already existed: thence he passed through Arabia and Persia to the Caspian sea. Thirty years later, we find him in Syria, and the second edition of his *Golden Meadows*, his last work, was written in Egypt. He is supposed to have died at Cairo, in the 345th year of the hegira, A.D., 956. He was a most voluminous writer upon a great variety of subjects, and no Arabian author enjoys a higher reputation with his countrymen. He was a geographer, a philosopher, a student of religions, to whom Confucianism and Christianity were as familiar as Mohammedanism, and a historian acquainted with the ancient and modern history of the east and west. His *History of the Times*, a history of all nations, has never been printed. A manuscript of it in twenty quarto volumes is in the library of the mosque of St. Sophia. His *Book of the Middle*, devoted largely to geographical inquiry, is known in Europe, only by quotations from it in Arabic writers. As his other works were too voluminous to become popular, he compiled a series of extracts from the *History* and *Book of the Middle*, and published them, with some additions, under the title of *Meadows of Gold* and *Mines of Gems*. This work contains a general view of the political, religious, and social history of the most important Asiatic and European countries; and it includes a treatise on their geography. A partial translation of the *Meadows*, appeared at London, in 1841, from the pen of Dr. Aloysius Sprenger, and as *El Masudi's Historical Encyclopædia;* and there is a French translation called *Les Prairies d'Or*, by Derenburg. Among Masudi's often quoted works, but existing in manuscript only, are *The Book of Consideration*, which treats of the order of succession to the Khalifati; the treatise *On Sincerity*, which gives an account of the various Mohammedan sects, and a treatise on *The Principles of Religion*. Dr. John Nicholson published in 1840 *An Account of the Establishment of the Fatemite Dynasty in Africa*, from a manuscript ascribed to Masudi.

MASULIPATAM', also called KISTNA or KRISHNA, a maritime district of British India, in the government of Madras. Area, 8,036 sq. m.; pop. '71, 1,452,374. Along the shore to a distance of 40 or 50 m. inland, the surface is exceedingly low, lower in some places than the shore itself, and the beds of the Kistnah and the Godavery, the chief rivers. The commercial crops are chay-root, indigo, tobacco, and cotton. Chief town, MASULIPATAM, on a wide bay, in lat. 16° 12' n. Pop. '72, 36,188, who carry on cotton manufactures to some extent.

MAT—MATTING, a product of the manufacture of diverse materials, multiform in shape and varied in design, for purposes differing with the climate and habits of the people where they are made. Flags, rushes, straw, cocoa-nut, and other palm-fiber, grass, rattan, the strands of rope, and the inner bark of trees are used. Some are of primitive pattern and rough workmanship, for the promotion of neatness in the home as a door-mat, to recline on for lack of a bed, for sails instead of canvas, and for doors

and windows. In recent, more refined development of the art, such rude fabrics have served only for protection in moving household and other goods, or preserving trees and plants from the severity of the weather. The manual process of plaiting fibrous material into mats is understood to be the rudimentary intertexture which has resulted—after passing through many gradations growing out of the luxurious habits of the Turks and Persians, and the need of the Mussulman for a portable mat to kneel upon—in the formation of textile fabrics out of threads and yarn, the almost fabulous product of the looms of Persia and India. Rush mats were used in palaces during the reigns of queen Mary and queen Elizabeth, even after the importation of carpets from the east, and lord Bacon, in describing a reception at which he was present, refers to a chair with "a table and carpets before it," meaning small carpets or rugs, which were then imported and considered very choice, straw and rushes being good enough for common wear. The first departure from this primitive manner of weaving was the insertion with the fingers of little tufts of woolen yarn between the threads of the warp. The same painfully slow process is employed at the present day in the manufacture of the famous Gobelin tapestries. In the South Sea islands the grass-mats made by the natives are noted for fine quality and brilliancy of coloring. In Japan a peculiar kind of rush is found, soft and elastic. In China floor-mats are made of a kind of grass cultivated in the south, and table-mats are made of rattans and rushes; the familiar Canton matting and Japanese mats being also made of rushes. In Spain and Portugal they are made from reeds and rushes, and in Russia the manufacture is a branch of common industry. It is used for packing all their exports, and is made of the bark of the lime or linden tree, sometimes called "bast," which calls the whole people into the woods in the early summer to collect the bark, especially in the dominion of Viatka and adjoining districts. The bast trees of n. Europe (the linden or basswood of the United States), used also in the culture of bees, supply an inner bark, which, made into strands and woven and twisted into the required form, are called bast mats or Russia matting. The mats are usually from 1½ to 2 yards square, and are of great importance in the manufacture and exports of Russia, the exportation in one year amounting to 14,000,000 mats. In America bast from the linden is sold for tying plants in grafting. In Russia the bast is prepared by steeping the bark in water for a few days, taking it from young and tender trees. After the steeping process its layers readily come apart, and are used for different purposes according to their texture. In Spain and Portugal esparto grass, a species of rush found in the s. of Spain, is used principally for the manufacture of cordage, but is said to make beautiful mats. Sugar and grain imported from the Mauritius comes packed in mats made of leaves. India matting is woven from *papyrus corymbosus*, according to Simmonds, by others said to be *papyrus Pangorei*, a kind of sedge resembling grass, but with a solid stem.

MAT'ADOR (Spanish, "slayer"). See BULL-FIGHT.

MATAGORDA, a co. in s.e. Texas, having the gulf of Mexico for its s. and s.e. boundary, the Matagorda bay in the extreme s., and Live Oak bay in the s.e.; drained by the navigable Colorado river, flowing through it centrally and emptying into Matagorda bay; 1300 sq.m.; pop '80, 3,940—3,735 of American birth, 2,520 colored. It is bounded on the e. and s.e. by San Bernard creek. Its surface is generally level, and has a good supply of timber, oak, and cedar; the pecan, hackberry, and other tropical trees grow on the river banks, the alluvial soil of which as well as the rich sandy soil of the level prairies, furnishes nutritious grass, and produces corn, tobacco, cotton, wool, sweet potatoes, butter, and sugar cane. Seat of justice, Matagorda.

MATAGOR'DA, a sea-port and bay on the gulf of Mexico, at the mouth of the Colorado river, Texas, United States of America, 80 m. w.s.w. of Galveston, an important outlet of a country rich in cotton, sugar, rice, etc. The town was destroyed by a storm in 1854, but has been rebuilt, and contains a population of about 2,000.

MATAGORDA ISLAND, a long, sandy island in Calhoun co., Texas, separating Espiritu bay from the gulf of Mexico; lat. 28° 20′ 49″ n., long. 96° 23′ 30″ west. On its northern end, near Pass Cavallo, is an iron light-house with a flashing light.

MATAMO'RAS, a river-port of Mexico, in the department of Tamaulipas, is situated on the s. bank of the Rio Grande, 40 m. from the mouth of that river in the gulf of Mexico. Pop. 20,000. The chief exports are specie, hides, wool, and horses; the chief imports, manufactured goods from Great Britain and the United States.

MATAMOROS, MARIANO, 1770–1814; of Mexican birth; very little is known of his early life or education. He is first heard of as a priest at a small village called Jantelоco, in the district of Cuernuraca, but in 1811, aroused by the constant atrocities and insults of the Spanish troops, he joined the army of insurgents under command of the patriot, Morelos. By him he was given the rank of col., and took a most important part in the battles of Cuantla (1812), Oaxaca, and most notably at the victory of San Augustin del Palmar (1813), which was due almost entirely to his military genius. Had his nominal superiors relied implicitly on Matamoros's judgment as a gen., the issue of the revolution might have been reversed; but rashly attempting the attack on Valladolid, the Mexican leader's forces were routed and "the right hand of Molero," as Matamoros was popularly named, captured and shot at the city of Valladolid, Feb. 13, 1814. His

name has been bestowed on the large city of Matamoros, on the banks of Rio Grande, and upon many smaller towns and districts of the country. By the historians of the time he is regarded as, of all the revolutionary leaders of the period, the one best fitted, from a military point of view, to command success.

MATANZAS, a fortified t. and sea-port on the n. coast of the island of Cuba, 55 m. e. of Havana, with which it is connected by railway. It is situated in an exceedingly rich and fertile district, has an excellent, well-sheltered harbor, and a pop. of 36,000. After Havana, it is the most important trading place on the island.

MATAPAN, CAPE. See CAPE MATAPAN, *ante*.

MATARO', a flourishing city and seaport of Spain, in the province of Barcelona, 17½ m. n.e. by railway from the city of that name. There are here cotton-spinning mills, several of which are driven by steam, sailcloth factories, tanneries, several iron-foundries. Pop. 17,500. At the harbor, there are docks, at which ship-building is carried on.

MATCHES, pieces of various inflammable materials prepared for the purpose of obtaining fire readily. One of the first forms of this useful article was the brimstone match, made by cutting very thin strips of highly resinous or very dry pine-wood, about 3 in. long, with pointed ends dipped in melted sulphur; thus prepared, the sulphur points instantly ignited when applied to a spark obtained by striking fire into tinder from a flint and steel. This was in almost universal use up to the end of the first quarter of the present century, when several ingenious inventions followed each other in rapid succession, and displaced it so completely that it would be now very difficult to purchase a bunch of brimstone matches. The first of these inventions was the "instantaneous-light box," which consisted of a small tin box containing a bottle, in which was placed some sulphuric acid with sufficient fibrous asbestus to soak it up and prevent its spilling out of the bottle, and a supply of properly prepared matches. These consisted of small splints of wood about 2 in. long, one end of which was coated with a chemical mixture, prepared by mixing chlorate of potash, 6 parts; powdered loaf sugar 2 parts, powdered gum-arabic, 1 part; the whole colored with a little vermilion, and made into a thin paste with water. The splints were first dipped into melted sulphur, and afterwards into the prepared paste. They were readily inflamed by dipping the prepared ends into the sulphuric acid. There were several disadvantages in this invention, especially those arising from the use of so destructive a material as sulphuric acid, which also had another drawback: its great power of absorbing moisture soon rendered it inert by the absorption of moisture from the atmosphere. The lucifer match succeeded the above, and differed materially: the bottle of sulphuric acid and all its inconveniences were dispensed with; the match was either of small strips of pasteboard or wood, and the inflammable mixture was a compound of chlorate of potash and sulphuret of antimony, with enough of powdered gum to render it adhesive when mixed with water, and applied over the end of the match, dipped as before in melted brimstone. These matches were ignited by the friction caused by drawing them through a piece of bent sand-paper. So very popular did these become, that although they have since passed away like their predecessors, they have left their name behind, which is popularly applied to other kinds since invented. Next to the lucifer in importance was the congreve, which is the one generally used at present. The body of the match is usually of wood, but some, called vestas, are of very thin wax-taper. The composition consists of phosphorus and niter, or phosphorus, sulphur, and chlorate of potash, mixed with melted gum or glue, and colored with vermilion, red-lead, umber, soot, or other coloring material. The proportions are almost as varied as the manufacturers are numerous. The congreve match requires only a slight friction to ignite it, for which purpose the bottom or some other part of the box is made rough by attaching a piece of sand-paper, or covering it, after wetting it with glue, with sand. Amadou, or German tinder, is largely made into congreve matches or fusees, as they are often called, for the use of smokers to light their pipes or cigars. One of the latest and best introductions is that of Bryant and May, which is properly called the "special safety match." With every variety of lucifer and congreve, there are certain dangers attending the use, for in both a slight friction will ignite them, and as, from the very nature of their application, they are apt to be carelessly thrown about, they are consequently exposed to the risk of accidental friction, and have doubtless been the cause of numerous and serious conflagrations. The congreves are exposed to further risks of accidental ignition arising from the employment of phosphorus, which, from its very inflammable nature, will ignite spontaneously if the temperature is a little higher than ordinary. The match of Messrs. Bryant and May, although a new introduction, was invented in Sweden, under the name of the Swedish safety match, by a Swede named Lundstrom, a large manufacturer of matches at Jönköping, in 1855 or 1856, and patented in this country by the firm above mentioned. The only essential difference from the congreves is in leaving out the phosphorus from the composition applied to the match, and instead, mixing it with the sand on the friction-surface, thus separating this highly inflammable material from its intimate and dangerous connection with the sulphur and chlorate of potash. This simple invention seems to have removed all the objections from the use of this class of matches. They light "only on their own box."

Many ingenious inventions have been introduced for making the wooden splints.

The square ones, which have always proved to be the best, are cut very simply by two sets of knives acting transversely to each other. The round ones, which always have the fault of weakness, are cut by a perforated steel plate invented in 1842 by Mr. Partridge. The perforations are the same size as the splints; and their edges are sufficiently sharp, when pressed on the transverse section of the wood, to cut down through it. The various ornamental forms of the German match-makers, who excel in this manufacture, are produced by planes, the irons of which are so constructed as to plow up splints of the form required. These are usually made of a soft kind of pine wood—that of *abies pectinata* is preferred in Austria and Germany—of which vast quantities are yielded by the forests of upper Austria. Until the introduction of amorphous phosphorus (see PHOSPHORUS), the trade of match-making was fearfully unhealthy; the emanation of phosphoric acid, when common phosphorus was used, gave rise to necrosis, or mortification of the bones, and fatal effects often followed. Too many manufacturers are still using the common kind for cheapness, but others avoid the injury to their work-people by employing the amorphous kind. This, and other dangerous manufactures, demand legislative interference.

The trade in matches has assumed enormous dimensions, especially in Germany, where vast quantities are exported. One firm, having its principal establishment at Schüttenhofen in Bohemia, employs 2,700 persons in this manufacture; more than one firm in England produces 10,000,000 congreve matches per day; and a Birmingham firm manufactures daily 8 miles of thin wax-taper, and converts it into congreve matches. Indeed, so wonderfully has match-making developed itself that in this country more thousands are now engaged in it than there were hundreds of persons who found employment in making the brimstone matches formerly.

MATCHLOCK. See LOCK.

MATE (allied to *meet*, measured, suitable, conformable, equal, companionable) is an assistant, a deputy, or a second in any work; in this sense it is a common word in nautical affairs. In the navy its use is now confined to petty officers, such as boatswain's mate, gunner's mate, etc.; but formerly several officers bore the title, as master's mate, now second master, surgeon's mate, now assistant-surgeon. Until within a few years the distinctive term *mate* survived, and was applied to a grade between lieutenant and midshipman: the title is now changed to *sublieutenant* (q.v.).

In the merchant-service the mates are important officers, holding functions not greatly inferior to those of lieutenants in the royal navy. The first mate ranks next to the master or captain, commands in his absence, and is immediately responsible for the state of the vessel; the second and third (and fourth in large well-found vessels) have various analogous duties, the junior mate generally having the superintendence of the stowage of the cargo.

MATÉ, or PARAGUAY TEA, a substitute for tea, extensively used in South America, and almost universally through Brazil. It consists of the leaves and green shoots of certain species of holly (q.v.) more especially *Ilex Paraguayensis*, dried and roughly ground; the leafy portion being reduced to a coarse powder, and the twigs being in a more or less broken state, sometimes, however, as much as an inch in length. The term *maté*, which has by usage attached to this material, belonged originally to the vessels in which it was infused for drinking; these were usually made of gourds or calabashes, often trained into curious forms during their growth. Into the hollow vessels thus formed a small quantity of the material, more properly called *yerba de maté*, is put, and boiling water is added; it is then handed round to those who are to partake of it; and each being provided with a small tube about 8 in. in length, with a small bulb at one end, made either of basket-work of wonderful fineness, or of perforated metal, to act as a strainer, and prevent the fine particles from being drawn up into the mouth, dips in this instrument, which is called a *bombilla*, and sucks up a small portion of the infusion, and passes the maté-bowl on to the next person. It is usual to drink it exceedingly hot, so much so as to be extremely unpleasant to Europeans. Its effect is much the same as tea, stimulating and restorative; and it derives this property from the presence of a large proportion of the same principle which is found in tea and coffee—viz., *theine*. The collection and preparation of maté is a large industrial occupation in Paraguay and Brazil; and the learned and accurate botanist Mr. John Miers has proved that not only *Ilex Paraguayensis*, but also *I. curitibensis*, *I. gigantea*, *I. ovalifolia*, *I. Humboldtiana*, and *I. nigropunctata*, besides several varieties of these species, are in general use. It is very remarkable that when caffeic acid, to which coffee owes its agreeable flavor, independently of the theine, is treated with sulphuric acid and binoxide of manganese, it forms kinone; and by treating the maté with the same agents, kinone has also been obtained.

Upwards of 5,000,000 lbs of maté are annually exported from Paraguay to other parts of South America; but it is not yet an article of export to other quarters of the world.

Ilex Paraguayensis is a large shrub or small tree; with smooth, wedge-shaped, remotely serrated leaves, and umbels of small flowers in the axils of the leaves. The leaves of many species of holly possess properties very different from those of the maté trees. Some are emetic.

MATELICA, a t. in the province of Macerata, or, as it is sometimes called, *Macerata-e-Camerino*, one of the former papal states and a part of the district known as the Marches. It is a walled town of from 3,000 to 3,500 inhabitants, situated on the San Angelo river and not far from 25 m. s.w. of the town of Macerata. The place contains several convents and churches. The inhabitants are chiefly engaged in agriculture, the raising of fruit, and, to a small extent, in woolen manufactures.

MATERA, a c. of the Italian province Potenza, situated between lovely valleys, 37 m. w. n. w. of Taranto. Pop. 14,225. It has an episcopal palace, a cathedral, and a college, but its lower classes are reputed the most uncivilized of southern Italy; they dwell chiefly in ancient caverns, excavated in the side of the deep valley surrounding the town, and are much afflicted with cretinism. Matera has manufactures of leather and arms, and a trade in nitre and agricultural produce.

MATERIAL CAUSE, in metaphysics, is the first in order of the four kinds of causes which Aristotle points out, and which later philosophers generally adopt. As thus defined it is the physical basis for the existence of a thing; or, in other words, the matter of which the thing is made. The material cause of a thing is, consequently, to some extent the thing itself; for example, it has been said that the material cause of a marble statue is marble, yet of any particular block of marble, parts must be cut away in order that the finished statue may appear.

MATERIALISM. This the name for a certain mode of viewing the nature of mind, namely, to regard it either as mere matter, or as a product of the material organization. The opposite view is called spiritualism, and means that the mind, although united with the body, is not essentially dependent on bodily organs, but may have an existence apart from these. There has been much controversy on this question; and although in later times the immateriality of the mind has been the favorite view, and been treated by many as a supposition essential to the doctrine of man's immortality; yet, in the earliest ages of the Christian church, the materialistic view was considered the most in unison with revelation, and was upheld against the excessive spiritualizing tendencies of the platonic schools. Tertullian contended that the scriptures prove, in opposition to Plato, that the soul has a beginning, and is corporeal. He ascribes to it a peculiar character or constitution, and even boundary, length, breadth, height, and figure. (This last view is incompatible with the definition of mind. See MIND.) To him, incorporeity was another name for nonentity (*nihil est incorporale, nisi quod non est*); and he extended the same principle to the Deity, who, he conceived, must have a body. He could not comprehend either the action of outward things on the mind, or the power of the mind to originate movements in outward things, unless it were corporeal.

The state of our knowledge at the present time shows us more and more the intimacy of the alliance between our mental functions and our bodily organization. It would appear that feeling, will, and thought are in all cases accompanied with physical changes; no valid exception to this rule has ever been established. Mind as known to us, therefore, must be considered as reposing upon a series of material organs, although it be totally unlike, and in fundamental contrast to, any of those properties or functions that we usually term material—extension, inertia, color, etc. We never can resolve mind into matter; that would be a confounding of the greatest contrast that exists in the entire compass of our knowledge (see MIND); but we are driven to admit, from the whole tenor of modern investigation, that the two are inseparably united within the sphere of the animal kingdom. "Our consciousness in this life is an *embodied* consciousness. Human understanding and belief are related, in a variety of ways, to the original and successive states or the bodily organism from birth to death. Observation and experiment prove the important practical fact that the conscious life on earth of every individual is dependent on his organism and its history" (professor Fraser's *Rational Philosophy*). See Lange's able *Geschichte des Materialismus* (Eng. transl. 1877).

MATERIALISM (*ante*). One difficulty in treating this subject is that of giving a definition of the term satisfactory to all parties. Webster defines a materialist as "one who denies the existence of spiritual substances, and maintains that the soul of man is the result of a particular organization of matter in the body." Knight's English cyclopædia defines materialism as "a name applied to any philosophical system which denies the existence of a spiritual or immaterial principle in man, called the mind or soul, distinct from matter; or in other words, denies the immateriality of the soul." The *Encyclopædia Britanniea* says "materialism is the name given to that speculative theory which resolves all existence into a modification of matter." The latter definition is practically the most comprehensive and correct, although some materialists might with justice object to it without modification, for there are those who are practically materialists, if they do not call themselves such, who do not deny the existence of God, at the same time that they maintain that matter contains within itself—either endowed, or originally possessing—properties by which it is capable of transforming itself into the various forms of life, and moreover that this power is not essentially the active presence of Deity. The belief of the union or the unity of God and matter is pantheism (q.v.). It is common to denote the opposite doctrine to materialism by the term idealism; but this fails to make sufficient distinction, and is not as appropriate as the word spiritualism in

its proper sense, as used to designate a belief in a spiritual being who created the universe and controls its phenomena by laws or by continuous force, and who has moreover endowed certain of the higher animals with certain degrees of intelligence, giving to man especially intellectual powers which are generally believed to result from the possession of an immaterial and immortal spirit separate from the divine, which, upon the dissolution of the body, is to continue its existence in another world, and, moreover, as those who accept divine revelation believe, is to be rewarded or punished. The terms materialism and materialist have often been misapplied, and it is sometimes difficult to form an opinion as to whether the views of some of the ancient, as well as modern philosophers are essentially materialistic or not. Democritus is usually classed as a materialist; but such a disposal of his philosophy cannot accord with a rational treatment of the subject of materialism as it meets us to-day, for one of his propositions is as follows: "The soul consists of fine, smooth, round atoms, like those of fire. These atoms are the most mobile, and by their motion, which permeates the whole body, the phenomena of life are produced. Democritus also believed that this matter was distributed throughout the universe, producing the phenomena of heat, light and life. Epicurus, who may be considered in some respects as a follower or disciple of Democritus, taught that the soul was a fine substance, distributed through the whole mass of the body, and most resembles the air, with an infusion of warmth. This soul was not, however, immortal, but ceased to live on the dissolution of the body; but it was something superior to the matter of the body. This, therefore, was at least a modified form of materialism, and not that which invests the matter of the body itself with vital and intellectual power. It was not so spiritual a doctrine as that held by Socrates and Plato, the soul, according to them, being indestructible and devoid of all grossness. The author of the article "Materialism" in Knight's English cyclopædia says: "The systems to which the name materialism is applied may be roughly distributed under a threefold division. First, it is applied to a system (like that of Hartley) which admits the existence of a soul, but which, attempting to explain mental phenomena physically, or by movements arising out of the bodily organization, seems to imply materialism. Secondly, it is applied to the system of Hobbes and Priestly, and of the French school of writers of which De la Mettrie may be taken as a specimen, which distinctly deny the existence of a soul as a separate principle in man, but which do not deny either a God or a future state. In the systems of these writers is evolved the pure and proper idea of materialism divested of all unnecessary consequences. Thirdly and lastly, the name is applied to systems like that of the ancient Epicureans, which deny both a future state of rewards and punishments, and a divine creator, systems for which atheism would be the better name, inasmuch as materialism fails to denote their more important and distinctive ingredients." Upon further mention of Priestly this writer says: "He does not deny the immortality of man and a future state of rewards and punishments. On the contrary, he distinctly affirms these on the authority of Scripture. It is needless to add that Dr. Priestly does not deny the existence of a God." It is therefore perceived that there are various ideas as to what constitutes materialism.

It would be unprofitably occupying the space assigned to this article to undertake even to give a summary of the history and development of the various theories connected with the doctrine of materialism. Its history is found scattered through various writings, much of it embodied in the biographies of the various philosophers who have from time to time in all ages propounded theories; in philosophical histories of different epochs and nations; in philosophical and religious disquisitions and sermons; in various works on metaphysics and philosophy, and in systematic histories. No attempt will therefore be made even to assign many of those who have written upon the subject their just and proper position. It would be impossible to give a fair representation of their views in a few pages, when long dissertations have failed. As far, therefore, as regards the history of the subject the reader is referred to the various biographical notices of persons which may be found in this work, such as Democritus, Pythagoras, Socrates, Plato, Aristotle, Lucretius, Empedocles, Epicurus, Bacon, Locke, Hobbes, Berkeley, Gassendi, Descartes, Leibnitz, Kant, Spinoza, Hegel, Holbach, and Priestly, and to the accessible works of these philosophers, as well as to those of more modern authors, on both sides of the subject, metaphysicians and scientists, such as sir William Hamilton, Paley, Jonathan Edwards, Mark Hopkins, Charles Hodge, Edward Hitchcock, Maudsley, Herbert Spencer, Huxley, Tyndall, James D. Dana, John W. Draper, William B. Carpenter, Joseph Le Conte (*Religion and Science*), Bastian, Lionel Beale, Hermann Lotze, Heckel, Charles Darwin, and Du Bois Reymond, and to Lewes's *History of Philosophy*, and Lange's *History of Materialism*.

What are the evidences in favor of materialism, what are the evidences against it, and what is the nature of these evidences? On the one hand, physical examination fails to find, or at least to demonstrate, any physical power in the living organism which cannot be accounted for by correlation of physical forces, and it is contended that the performances of various functions follow each other consecutively, according to external circumstances. As far as the doctrine of evolution may be made use of to favor that of materialism, it is contended that geology and zoology furnish evidence of the gradual progression in development from lower to higher forms of life. There are connecting-links, it is asserted, which show that one form of animal organization has been trans-

formed into another. In some of the lower crustaceans particularly, the transformations are held to be quite evident. In the cœlenterata (jelly fishes, etc.) various metamorphoses and alternations of generations occur (see GENERATIONS, ALTERNATION OF) which are held as evidence of the power of evolution possessed by protoplasmic matter. Geology is claimed to have given a verdict in favor of progressive development in the discovery of fossils of the horse family in tertiary formations from the eocene up to the quaternary period (see HORSE, FOSSIL). The experiments of several scientists with vegetable infusions for a long time seemed to show that animal organisms could be developed in dead organic matter containing no living germs, but recently it has been shown that when proper precautions are taken to exclude all atmospheric germs and also to destroy all living matter contained in the infusions, no development of life takes place. A recent writer remarks: "Numerous questions have arisen from time to time through the conflicts of materialism with opposing doctrines, and it will be found that these questions have been brought to definite issues, in our day, for final settlement." This is either hoping for too much or for a questionable result. It is more probable that human investigation will never bring the question to a settlement, but that it will ever elude the grasp of the investigator, and it is probably a wise provision that it is so. It is a conflict out of which flows the most beneficial effects upon human character and understanding; for it is a law of nature that all our faculties, physical as well as mental, are strengthened and more perfectly developed in combating with opposing forces. No machine, intellectual or physical, can accomplish work without opposing force or *resistance*. Moreover, if we possessed complete evidence that we totally perished when our bodies underwent dissolution, or that our spirits were immortal, coupled with a foresight of our destiny, no beneficial result could follow, but we would, with the natures we now possess, perhaps be rendered miserable. One of the principal evidences which have been brought forward against the doctrine of materialism is the almost universal aspiration after a future life. Dr. John William Draper, in his *History of the Conflict between Religion and Science*, says: "Nature has thus implanted in the organization of every man means which impressively suggest to him the immortality of the soul and a future life." But this is a belief and will probably always continue a belief. Leibnitz attempted to prove the immortality of the soul by his doctrine of monads, but probably no writer has furnished more ideas to fortify the doctrines of materialism than he; the essence of his doctrine was indeed materialistic. The atom produces its own sensations from itself, and it develops itself in accordance with its own internal laws of life. Every monad is a world to itself, and no one is like another, but the ideas of all the monads consist in an eternal system, in a complete harmony, which was ordained from the beginning of time, and which constantly persists through the continuous vicissitudes in all the monads. Every monad represents to itself, confusedly or clearly, the whole universe, the whole sum of all that happens, and the sum of all the monads in the universe. The monads of inorganic nature have only ideas which completely neutralize themselves, as those of a man in a dreamless sleep. The monads of the organic world are higher, the lower animals being formed of dreaming monads. In the higher, they have sensation and memory, and in man they have thought. Lange observes: "The monads with their preestablished harmony reveal to us the true nature of things as little as the atoms and the laws of nature. They afford, however, a pure and self-contained conception of the world, like materialism, and do not contain more inconsistencies than this system. But what especially secured the popularity of the Leibnitzian system is the ductile looseness of its notions, and the circumstance that its radical consequences were much better marked than those of materialism. In this respect nothing is more useful than a thoroughgoing abstraction. The tyro who shudders at the thought that the ancestors of the human race might once have been compared with the apes of to-day, comfortably swallows down the monad theory, which declares the human soul to be essentially like all the beings of the universe, down to the most despised mote, which all mirror the universe in themselves, are all small divinities to themselves, and bear within them the same content of ideas, only in various arrangement and development. We do not immediately observe that the ape monads are also included in the series, that they are as immortal as the human monads, and that they may yet, perchance, in the course of development, attain to a beautifully ordered content of ideas. . . . It is very much the same with the much-extolled and much-abused optimism of Leibnitz's system. Viewed in the light of reason, and tested by its real presuppositions and consequences, this optimism is nothing but the application of a mechanical principle to the foundation of the facts of the world. God, in choosing the best of possible worlds, does nothing that would not be quite mechanically produced if we suppose the essences of things to act upon each other. In all this, God proceeds like a mathematician in solving a problem, and he must so proceed, because his perfect intelligence is bound to the principle of sufficient reason—in the result it all comes to the same thing as if we were to deduce the development of the universe from the mechanical presuppositions of a Laplace and a Darwin." (Lange, *History of Materialism*. Boston: Houghton, Osgood & Co., 1880, pp. 130, 131, 132.) The question ever recurs, how can matter produce thought? The assertion by Leibnitz that it is the inherent principle of the monad, it is contended, is only an assertion, a product of the imagination, and the doctrine that a certain combination of atoms produces it, is likewise held to be just as much the result of imagination. That

it requires organization to produce manifestations of thought, which we, as physically constituted beings, can comprehend or perceive, is a necessity of the case, and a condition which limits human knowledge. We cannot make a physical demonstration of a purely spiritual subject. If the mind acts or exists without the intervention of matter we are necessarily unconscious of it, and are obliged to search for other evidences than material phenomena, and for the advocate of the production of thought by the correlation of atomic energy to demand that the spiritualist shall accept only physical evidences is equivalent to the dictating the limits of controversy. Four thousand years of experience and 2,000 years of controversy have not settled the question. Perhaps if an instance could be cited in which rapidity of thought had far outstripped all the possibilities of physical methods, it would furnish strong evidence of the immateriality of the human mind, unless, indeed, we adopt Leibnitz's doctrine of monads. Have there been such instances? Is it possible that there ever was a case in which the nervous mechanism, or a part of it, admitted a perfectly unobstructed performance of an intellectual function by the immaterial principle or mind? Can we account in any other manner for the remarkable mathematical calculating powers of Zerah Colburn (q.v.), who could answer accurately, almost in an instant, such questions as the following, and others much more difficult: How many seconds are there in 11, 15, or 16 years? What is the square of 999,999? etc. This is an instance of the almost perfect adaptability of nervous organization to its uses. It is so much in excess of ordinary—what we term, perhaps improperly—normal mental activity, that it becomes a question whether we are not compelled to regard it as the result of the comparatively unobstructed operations of a spiritual intelligence. The fact that this remarkable talent left him at about the age of 21 would be explained by a spiritualist in one way, and by a materialist in another. An unsolvable question is always capable of receiving opposite explanations. The probabilities may very greatly preponderate to one side, but they are not sufficient to convince, and the most sincere minds may be so constituted as to form opposite conclusions. When the experiments in spontaneous generation above alluded to were shown to be faulty, it was believed by many that the doctrine of evolution, as well as that of more decided materialism, had received a severe blow, but an evolutionist was among the foremost in demonstrating the failure of spontaneous generation, and the majority of evolutionists are probably opposed to the doctrine of spontaneous generation. The results of such experiments do not, however, affect permanently either the doctrine of evolution or of materialism or spontaneous generation. If spontaneous generation ever takes place, it may require conditions which are incompatible with the sealing of boiled infusions in flasks, or their protection from the descent of atmospheric germs by the bending down of open capillary beaks of the flasks. But if it could be satisfactorily proved that spontaneous generation never occurs, it would not aid the establishment of the doctrine of spiritualism. The truth is that the nature of the question does not admit of physical or experimental proof, and, indeed, does not seem to be affected by geological evidence.

The argument for the existence of an intelligent spirit independent of the body, and not subjected to the variations of its physical functions, must, from the necessity of the case, be carried on by the reasoning powers, with perhaps some reliance upon physiological facts as means of explanation; but the most important part of the argument, leaving out the question of a revelation, rests upon the evidences of design. If it is admitted that the works of nature furnish such evidence, then there is a Being whose attributes must be such as to make it probable that the mind of man has not been endowed with intellectual powers and aspirations which are destined to end in nothingness. To maintain that inorganic matter could have arranged itself in the various living forms with all the adaptations of means to ends, both as regards use and beauty, because the Creator does not manifest himself in person, because we are not permitted to perceive him with our senses, is, as Paley has logically said, quite as inconsistent as to deny that a watch is the product of mechanical design merely because the process of its construction had not been the subject of personal observation. The processes of nature do, indeed, take place in ways that are perfectly mysterious and unknown to us. Certain invariable effects are called laws, but the secret springs by which those laws are executed are entirely beyond our ken. We call a certain force the attraction of gravitation, but what, in reality, that attraction is, is no more known to us than if we had not learned to measure or to trace the paths of the planets. We cannot cast aside the evidence furnished by inexorable logic, and that logic tells us that if circumstantial evidence is of value, all matter is moved by supernatural power. Leibnitz and others thought they had discovered that power as residing in the matter itself, but others, and among them perhaps the most acute and broadly observing experimental philosopher the world has ever known, Faraday, have placed it in points and lines of force, for the purpose of giving a scientific expression to certain facts, at the same time acknowledging their utter inability to come any nearer a solution. Faraday, in a lecture on mental education, in 1854, used the following words: "High as man is placed above the creatures around him, there is a higher and far more exalted position within his view; and the ways are infinite in which he occupies his thoughts about the fears, or hopes, or expectations of a future life. I believe that the truth of the future cannot be brought to his knowledge by any exertion of his mental powers, however exalted they may be; that it is made known to him by

other teaching than his own, and is received through simple belief of the testimony given." Here is the testimony of one of the most rigid of scientific investigators that the highest evidence of spiritual existence is internal; and why, we may ask, may not such evidence, coming as it does from hundreds of thousands of all classes of persons, the most highly cultured as well as others, be received as well as speculations about the properties of protoplasm or of monads? If unanimity of testimony is of value, certainly there is more of it among the thousands who believe than among the disputants in the scientific arena. But we dismiss all these points with the remark that although, as Faraday says, in a subsequent sentence to the above, that man by reasoning cannot find out God, he is compelled to use his reasoning powers in the study of nature in such a way as to lead him to adopt the best methods of forming a belief as to his relations to time, as well as his present surroundings. The world is full of what to the human understanding are inexplicable facts. Certain persons perform the most irrational acts, not only those which appear to the ordinary understanding to be irrational, but which, according to all the laws of mental philosophy, are known to be irrational; and yet we can give no satisfactory explanation of them. To say that the organism is deranged proves nothing for either side of the question, for the mind, it may be said by one, requires an instrument not deranged to manifest itself, while the other contends that rational thought can only be *produced* by an organism which retains to a certain degree the harmony of its parts, or, in other words, which possesses certain physical relations. In either case, whether the brain is the instrument or the producer of thought, it requires to be in order, and it will be seen that an attempt to demonstrate either the presence or the absence of spiritual power will fall short of actual proof, and that the best we can do is to form a well-founded belief. The great fact that design is stamped upon all the works of nature, must always be borne in mind. We can conceive of no designing power independent of Him whom we call Providence or God, and when we acknowledge his existence we are forced to admit that his creatures must have been the subject of his care, and that he has not left them to grope in blindness throughout all the ages of their past existence without a light more than that which can be furnished by physico-scientific investigations. What, then, it may be asked, is the value of physical research? Its proper fruits or objects, if we reason from analogy and observe the beneficent provisions of surrounding nature, are intellectual enjoyment and the cultivation of a faith, that highest attainment of the understanding, which rests with confidence upon the eternal justice of the unseen government of the universe, and which shall finally show to mankind that their highest aspirations are not idle dreams produced by selfish or morbid longings which have no foundation in the constituted order of nature.

We see in nature the most perfect adaptation of means to ends. The mechanism of the human body perhaps offers the most perfect examples of this. The mechanism of the human hand has furnished a subject for one of the most profound and elegant of the Bridgewater treatises, by sir Charles Bell, and the contrivances found in the structure of the eye are still more illustrative of design. The evidence, however, offered in some of the lower forms of animals, are, as being simpler, more conclusive to the non-scientific observer. We walk along the sea-beach and pick up a mollusk which has recently been washed ashore or dug out of the sand. We remove the shell from the animal, and perceive that its hinge is cased over and interlaced with an elastic, gluey substance, which not only serves to assist in holding the shells in place, but by their elasticity to open them. In some cases the materialist, or the evolutionist might suppose that the living molecules in a certain part of the mollusk might, in accordance with certain physico-vital properties, arrange themselves for the purpose of accomplishing what might be termed an impending function, or a function becoming immediately necessary for the purposes of evolution or further development; but we open another species of bivalve mollusk, and instead of the mere addition or coating of a little elastic glue, we find at the hinge in either shell a chamber, hollowed out as by a mechanical instrument, and occupying the space so formed by the two little cups, an independent and detached elastic pad whose action is that of a spring in opposition to the muscles which close the shells. Nobody can make the examination without being almost startled at what, without irreverence, might be called the legible autograph of the Creator's hand. It is impossible to conceive how any process of gradual evolution, or of abrupt self formation, if such a phenomenon can be imagined, could bring about such a result. Now, it is not within the possibilities of science to demonstrate whether this mechanism has been brought about by the voluntary act of the Creator or by evolution. We are, therefore, left to adopt the most reasonable, the most probable, conclusion; and it is here, perhaps, that people will always differ. Some will contend that evolution is the only natural process of creation, while the mass of mankind will probably always think that the wonderful works of nature are too vast, too mighty, to be the production of anything less than omnipotent design.

Philosophers have been censured by believers in Bible revelation for sometimes calling the human body a human machine; but if the soul is independent and superior to the body, then the body must be a machine. Looking upon the subject in this light we can explain the influence of education, and also why the mind cannot manifest itself till its instruments, the parts of the nervous mechanism, are properly prepared. A perfectly intelligent soul might inhabit the body and yet not be able to manifest itself. Further

than this it has so far been, and will probably always continue to be, unavailing to attempt to reason upon this subject with the expectation of producing any positive evidence of the existence of a spiritual nature. This is the point at which belief or disbelief is adopted, and upon the foundation of either of these conclusions man's reason may continue to build systems, which, indeed, from the influence they exert upon the individual and upon society, may furnish evidences of their correctness or falsity. To be able to have a clearer view of the unseen world than that which science or logic offers, the veil which conceals the truth from us must be lifted, or we must believe it has been lifted, that a revelation has been made, and that the human race has not been obliged to live for thousands of years with no light except that furnished by human reason—that reason, notwithstanding its wonderful powers, which we often have cause to distrust, since the most powerful intellects have come to such opposite conclusions, starting from the same premises. To what extent is it reasonable and just to place ourselves under the guidance of faith? In the discussion of human affairs we perceive that it is one of the noblest of qualities, and that without it society would be a thousand times worse than the severest pessimist asserts. Therefore faith is one of the fundamental principles of our nature, and by no means to be excluded from the elements of evidence which we are to examine in forming an opinion as to whether this is a spiritual as well as a material world, and all the reasoning which might be attempted could never prevent the mass of mankind from resting on a foundation which ministers to their hopes, their sentiments, their affections; but, on the other hand, all the persuasive eloquence of the most exalted zeal of thousands of the believers in the spirituality of man's nature will be powerless in the presence of the restless efforts of many earnest and sincere minds, who cannot find it in their natures to relinquish the search after a truth which their opponents tell them can be found only by the aid of faith.

MATE'RIA MED'ICA is that department of the science of medicine which treats of the materials employed for the alleviation and cure of disease. Some writers, as Pereira, divide the subject into the inorganic and the organic, while others, as Christison, adopt an alphabetical arrangement. In the description of an inorganic compound, as, for example, iodide of potassium or calomel, the writer on materia medica notices (1), its physical properties; (2), its various modes of preparation; (3), its chemical composition and relations, including the tests for its purity, and the means of detecting its probable adulterations; (4), its physiological action on man and animals in large and small doses; (5), its therapeutic actions and uses, and the average doses in which it should be prescribed; and (6), the officinal preparations containing the substance in question, and their uses and doses: while in the notice of an article belonging to the organic department, the natural history of the source from whence it is obtained, and the mode of collecting or extracting it, must also be given.

MATHEMATICAL INSTRUMENTS include all those instruments employed in the determination of the length of lines or the size of angles. Pairs of compasses, surveying-chains, etc., are examples of the former class; while the compass, sextant, theodolite, and the numerous list of astronomical instruments generally denominated telescopes, including the equatorial transit instrument, mural circle, etc., form the latter class. The more important of these instruments will be treated of under separate heads.

MATHEMATICIANS (Lat. *mathematici*), the name given by the Romans to the professors of astrology, from the fact that, in all cases, those who practiced astrology also to some extent cultivated mathematical science. The Romans, unlike the Greeks, appeared not to comprehend the attractions possessed by mathematical studies, and being consequently unable to distinguish between the student of pure science and the fanatic enthusiast who attempted to derive a knowledge of future events on this earth from the position of the stars, joined them together in a common condemnation, under the name of "mathematici."

MATHEMATICS (Gr. *mathema*, learning), the science which has for its subject-matter the properties of magnitude and number. It is usually divided into *pure* and *mixed;* the first including all deductions from the abstract, self-evident relations of magnitude and number; the second, the results arrived at by applying the principles so established to certain relations found by observation to exist among the phenomena of nature. The branches of pure mathematics which were first developed were, natually, *Arithmetic*, or the science of number, and *Geometry*, or the science of quantity (in extension). The latter of these was the only branch of mathematics cultivated by the Greeks, their cumbrous notation opposing a barrier to any effective progress in the former science. Algebra (q.v.), or the science of numbers in its most general form, is of much later growth, and was at first merely a kind of universal arithmetic, general symbols taking the place of numbers; but its extraordinary development within the last two centuries has established for it a right to be considered as a distinct science, the *science of operations*. Combinations of these three have given rise to *Trigonometry* (q.v.) and Analytical Geometry. The Differential and Integral Calculus (q.v.) makes use of the operations or processes of geometry, algebra, and analysis indifferently; the *calculus of finite differences* is in part included under algebra, and may be considered as an extension of that science; and the *calculus of variations* is based upon the differential calculus. The term "mixed mathematics" is calculated to lead to error; "applied mathematics" is a more appropriate name. This

portion of mathematics includes all those sciences in which a few simple axioms are mathematically shown to be sufficient for the deduction of the most important natural phenomena. This definition includes those sciences which treat of pressure, motion, light, heat, sound, electricity and magnetism—usually called *Physics*—and excludes chemistry, geology, political economy, and the other branches of science, which, however, receive more or less aid from mathematics. For a notice of the separate sciences, see ASTRONOMY, OPTICS, MECHANICS, HYDROSTATICS, HYDRODYNAMICS, HEAT, ACOUSTICS, ELECTRICITY, MAGNETISM, etc.

MATHER, COTTON, an American colonial divine, son of Increase, was born at Boston, Feb. 12, 1663. He entered Harvard College when 12 years old, and his precocity and piety excited great expectations. He entered upon a course of fasting and vigils, cured a habit of stammering by speaking with "dilated deliberation," studied theology, became the colleague of his father in the ministry, and wrote in favor of the political ascendency of the clergy. The phenomenon termed "Salem witchcraft" having appeared in the colony, he investigated it, and wrote, in 1685, his *Memorable Providences relating to Witchcraft and Possessions.* He found that devils or possessed persons were familiar with dead and foreign languages, etc., and eagerly advocated the adoption of desperate remedies for the diabolical disease. It is well-known that Mather was responsible for the shedding of much innocent blood; and he himself admitted that "he had gone too far." In 1692, he published *Wonders of the Invisible World,* to which a reply appeared at London in 1700 by Robert Calef—the effect of which was to dissipate the somber and superstitious influence of the New England divine. With a remarkable industry, he wrote 382 works. His *Essays to do Good* have been highly commended by Franklin; and when we think of his misdeeds, which were serious, it ought also to be remembered that he helped to introduce into the States inoculation for the small-pox. He died Feb. 13, 1728. His life was written by his son, Samuel Mather (1729).

MATHER, COTTON, D D. (*ante*), having received his elementary education under his father's care, and at the free school in Boston, was able on entering Harvard college, at the age of 12, to read not only Virgil and other Latin classics, but Homer and Isocrates in Greek. On taking his first degree at the age of 16 the president addressed him in a Latin speech, praising his past conduct and attainments, and predicting a glorious future. The descendant of a long line of ministers, he himself desired to enter the ministry, but an impediment of speech prevented, and he began to study medicine. Having overcome the infirmity he studied theology, and in 1680 became assistant to his father in the North church, Boston, and in 1684 was ordained as co-pastor. While zealous and faithful as a preacher, he found time to write for the press, and published numerous sermons and books on practical piety, at the same time accumulating materials for various intended treatises. He began also the study of some modern languages, among them the Iroquois Indian. He believed that ministers should concern themselves in politics, and, desirous of maintaining the ascendancy of the clergy in civil affairs which had long prevailed, but which he saw declining, he prepared in 1689 the declaration of the people justifying the imprisonment of governor Andros. Sharing in the superstitions of the age, he firmly believed in witchcraft, and suspecting that there were in Boston devotees of Satan, he applied himself earnestly to detect them. An Irish woman having been denounced as a witch, and Mather having no doubt that she was under the influence of an evil spirit, she was tried, condemned, and executed. His book on witchcraft, published with the recommendation of all the ministers of Boston and Charlestown, was entitled *Memorable Providences relating to Witchcraft and Possessions; with Discoveries and Appendix.* It was eagerly read in the colony, and was republished in England with a preface by Richard Baxter; being pronounced perfectly convincing. With magistrates and people Mather urged the necessity of eradicating the sin. In 1692 the children of Mr. Parris, a minister of Salem, becoming strangely afflicted, accused an Indian servant of having bewitched them by her incantations. She was cast into prison, and confessed that she was guilty. The girls began to accuse others of being witches. The magistrates applied to Mather for advice, and he urged the adoption of the most stringent measures. The excitement was intense. By May, in Salem, 100 persons were in jail. The deputy-governor and 5 magistrates went from Boston to conduct the preliminary examinations, and on the arrival of the new charter a special court was appointed to try the accused. Several, though protesting innocence, were declared guilty and hung. Those who confessed their guilt and were penitent, had their lives spared. By September 20 persons had been put to death; 8 more were under sentence of death; 55 had confessed their guilt and escaped; above a hundred more were lying in jail, and twice that number were at large, suspected. The last execution was that of a Mr. Burroughs, formerly a minister at Wells, which made a deep impression on the country. A cry of horror was raised. A reaction began which Mather could not arrest. He drew up, with the concurrence of the governor, the president of Harvard university, and the ministers, an elaborate justification of what had been done, expressing "pious thankfulness to God for justice being so far executed among us," in a work entitled *The Wonders of the Invisible World: Observations upon the Nature, the Number, and the Operations of the Devils.* But it had no effect. In the trials that followed all the accused were acquitted. While some of the judges in the religious assemblies prayed for pardon if they had shed innocent blood, Mather showed no signs of

penitence or regret. In his *Magnalia Christi*, published 9 years afterwards, he indeed admits that perhaps there had been "a going too far in that affair." His influence now declined. Though admitted to be pre-eminent among his countrymen for genius and learning, he was twice passed over in the election of president of Harvard college. But he continued to labor with zeal. He was a voluminous writer. His *Magnalia Christi Americana* was a collection of facts for an ecclesiastical history of New England. Among his other works are *Essays to do Good; Christian Philosopher;* and *Directions to a Candidate for the Ministry.* The work on which he labored from his 31st year to his death is entitled *Illustrations of the Sacred Scriptures*, and the manuscript is now in the library of the Massachusetts Historical Society. He was the first, with Dr. Boylston, to introduce into this country inoculation for small-pox. In 1713 he was elected, on account of his *Curiosa Americana*, a fellow of the royal society of London, the first American who had received that distinction.

MATHER, INCREASE, an American colonial divine, son of Richard Mather, an English nonconformist minister, who emigrated to Massachusetts in 1635, was b. at Dorchester, Mass., Jan. 21, 1639. He was edueated at Harvard college, Massachusetts, and Trinity college, Dublin, and settled for 62 years as pastor of the North church, Boston. In 1684 he was also chosen president of Harvard college, for which he obtained the right to confer the degrees of B.D. and D.D. An industrious student, he spent 16 hours a day in his study, and published 92 separate works, most of which are now very scarce. One of these, entitled *Remarkable Providences*, was republished in the library of old authors (London, 1856). His influence was so great in the colony that he was sent to England in 1688 to secure a new charter, and had the appointment of all the officers under it. Mather died at Boston, Aug. 23, 1723.

MATHER, RICHARD, D.D., 1596–1697; b. Lowton, Lancashire, Eng.; studied at Oxford in 1618; became parish minister of Toxteth, Lancashire, where he remained 15 years; was suspended in 1634 for non-conformity to the established church; was restored through the influence of friends, but again suspended; removed to New England in 1635; was minister at Dorchester, Mass., 1636–69. Of his six sons, four were distinguished ministers and authors. He was the author of some theological treatises, chiefly on church government, and at the request of the Cambridge synod in 1648 he drew up a form of discipline, which was adopted. His *Journal, Life and Death*, was published for the Dorchester antiquarian and historical society. He was an earnest preacher, and a man of learning. He assisted Eliot in the New England version of the Psalms. He published a discourse on the *Church Covenant;* a treatise on *Justification*, and an elaborate defense of the churches of New England.

MATHER, SAMUEL, 1626–71; b. Toxteth, Eng.; graduated at Harvard college in 1643; preached at Boston, Oxford, and Dublin. At Trinity college, Dublin, he became senior fellow. He is the author of *Old Testament Types Explained and Interpreted.*

MATHER, SAMUEL, D.D., 1706–85; son of Cotton Mather; graduated at Harvard college in 1723; was ordained in 1732, and was pastor of several Congregational churches in Boston. He wrote a *Life of Cotton Mather* in 1729, and also some sermons, pamphlets, and short poems.

MATHEW, Rev. THEOBALD, commonly known as FATHER MATHEW, was descended from an illegitimate branch of the Llandaff family, and was born at Thomastown in Tipperary, Ireland, Oct. 10, 1790. On the death of his father, while Mathew was still very young, the kindness of the Llandaff family enabled the boy to enter the Catholic college of Kilkenny, whence he was transferred, as a candidate for the Roman Catholic priesthood, to the college of Maynooth in 1807. He left that college, however, in the next year. He relinquished the secular priesthood for that of the religious order of the Capuch'ns, in which he took priest's orders in 1814, and was sent to the church of his order in the city of Cork. His singularly charitable and benevolent disposition, his gentleness and affability, his simple and effective eloquence, and the zeal and assiduity with which he discharged all the duties of his ministry, won for him the universal love and respect alike of rich and of poor. To him was due the introduction of the religious, brotherhood of St. Vincent of Paul. He founded schools for children of both sexes, and contributed in a very marked degree to the correction of many abuses and indecencies connected with the burial of the dead, by establishing a new cemetery on the model of that of Père la Chaise, although, of course, of a far less pretentious character. But the great work of father Mathew's life is the marvelous reformation which he effected in the habits of his fellow-countrymen, and which has won for him the title of APOSTLE OF TEMPERANCE. In 1838 he established an association on the principle of total abstinence, at first confined to the city of Cork, but afterwards numbering 150,000 members in the city alone, and extending to the county and the adjacent districts of Limerick and Kerry. The marvelous success which attended this first local effort led to the suggestion that father Mathew himself should repair to the several great centers of population, especially in the south. Thence he gradually extended the field of his labors to Dublin, to the n., and even to Liverpool, Manchester, London, Glasgow, and the other chief seats of the Irish population, even in the new world itself. His success had something almost of the marvelous in its character. The form of engagement partook of the religious,

and was accompanied by the presentation of a medal, to which the utmost reverence was attached by the recipient; and an opinion prevailed among the poor that the mission of the "apostle of temperance" was marked by many miraculous manifestations of the assistance of heaven. It is difficult to form an exact estimate of the number of his association, but it included a large proportion of the adult population of Ireland, without distinction of rank, creed, or sex; and so complete was the revolution in the habits of the Irish people that very many distilleries and breweries ceased from working. Among the sufferers from this great moral revolution the members of father Mathew's own family, who were largely engaged in the distilling trade, were some of the earliest and most severely visited; and it is painful to have to add that the latter years of this great benefactor of his country were embittered by pecuniary embarrassments arising out of the engagements into which he entered in the course of his philanthropic labors. Although very large sums of money passed through his hands, in payment for the medals which were distributed to the members of the association, yet the exceeding munificence of his charities, and the enormous expenses connected with his various missions, and perhaps his own improvident and unworldly habits, involved him in painful difficulties. A pension of £300 was granted to him by the crown in acknowledgment of his eminent public services, and a private subscription was also entered into for the purpose of releasing him from embarrassment. He died in 1856, but the fruit of his labors is still visible in Ireland. Very many, it is true, of those who were enrolled in his association ceased after some years to observe the pledge of total abstinence; but very many also continued faithful; and while but few of those who abandoned the society relapsed into the extreme of drunkenness, the general tone of the public mind in Ireland as regards the use of intoxicating drinks may be truly said to have undergone a complete revolution, which endures to the present day.

MATHEWS, CHARLES, an English comedian, was born on June 28, 1776, and was educated in London. His father was a bookseller, and intended his son to follow the same profession; but his early inclination for the stage overcame parental counsel, and he made his first appearance as an amateur—curiously enough, in the part of Richard III.—at the Richmond theater in 1793, and as a professional comedian in the Theater Royal, Dublin, the following year. He first appeared in London at the Haymarket, and subsequently he transferred his services to Drury Lane. In 1818 he gave his "At Home" in London, and achieved an immense success. He visited America twice. In the autumn of 1828 he became joint proprietor of the Adelphi theater. He died at Plymouth on June 28, 1835, and was buried in that town.

Mathews was a wonderful master of personification and mimicry; and while imitating every one, he never lost a friend, or hurt the feelings of the most sensitive. His taste was as instinctive as his wit. His wonderful variety of facial expression and his gentlemanly sarcasm are still fondly remembered by old playgoers. His son CHARLES also achieved a brilliant reputation in the same department of histrionic art. Born Dec. 26, 1803, he died June 24, 1878.

MATHEWS, CHARLES JAMES, 1803–78; son of Charles Mathews, the comedian; educated as an architect and gave promise of success in that profession, but his natural taste was for the stage, and as a light comedian he soon achieved a high place. He married in 1838 the noted actress and singer, madame Vestris, and in connection with her carried on succesively the Olympic and Lyceum theaters, London. He visited the United States in 1839, 1858, and 1869, and on the second occasion married his second wife, Mrs. Davenport, known on the stage as Lizzie Weston. He played also in Paris and Australia, and everywhere made many warm admirers, not only of his professional talent but also of his personal qualities. He was the author of several plays, perhaps the best of which was *My Wife's Mother*. He also produced several entertainments after the manner of his father's "At Home."

MATHEWS, CORNELIUS, b. N. Y., 1817; educated at the university of the city of New York, and in 1837 called to the bar. Before and after his admission he contributed in verse and prose to various periodicals, such as the *Knickerbocker Magazine*, the *New York Review*, and the *American Monthly Magazine*. He has also contributed to the *Literary World*, and he was for a time an editor of *Arcturus*, a now forgotten monthly magazine. Of his voluminous works we may mention *Behemoth*, a romance, 1839; *The Politicians*, a comedy, 1840; *Witchcraft*, a tragedy, which was produced on the stage in 1846, and subsequently republished in London; and *False Pretenses*, a comedy, 1856. He has worked for many years in behalf of an international copyright, has published a number of addresses on that subject, and organized a copyright club, for whom he drew up an *Address of the Copyright Club to the American People*.

MATHEWS, GEORGE, 1774–1836; b. near Staunton, Va., and admitted to the Georgia bar in 1799; in 1805 was appointed judge of the superior court of the territory of Mississippi, and in 1806 transferred in the same capacity to New Orleans. After the organization of Louisiana as a state he was appointed presiding judge of the supreme court, and filled the post to the time of his death. His decisions form an important part of the judicial history of the state.

MATHIAS, THOMAS JAMES, 1750–1835; b. England; educated at Trinity college, Cambridge, of which he became a fellow. He was appointed treasurer of the household to queen Charlotte, from which office he retired with a pension in 1818. The later part of his life was passed at Naples, and during his long residence in Italy he became thoroughly acquainted with its language and literature. He wrote Italian verses with considerable fluency, but his principal service to Italian literature was his edition of Tiraboschi's standard work, *The History of Italian Poetry*. His first English production, which appeared in 1781, was an imitation from the Norse, called *Runic Odes*. This was followed, two years later, by an *Essay on the Evidence relating to the Poems attributed to Thomas Rowley*. His best work is *The Pursuits of Literature*, which was published anonymously between 1794 and 1797. The chief interest of the *Pursuits* lies in its satirical critical notes, which made a sensation at the time.

MATHIAS CORVINUS, King of Hungary, was the second son of John Hunyady (q.v.), and was b. in 1443. Having been released from the hands of the treacherous Frederick III. of Germany by Podiebrad, king of Bohemia, he returned to Hungary, and was elected king in 1458. His accession was hailed with the utmost enthusiasm over the whole country. But the Hungarian crown at this time was no chaplet of roses; two sovereigns, alike formidable, the one, Mohammed II., from his military talents and immense resources, the other, Frederick III., from his intriguing policy, were busily conspiring against the boy-king. To meet these dangers, Mathias rapidly carried out his measures of defense, the most important of which was the formation of a regular force of cavalry, to form which one man was enrolled out of every 20 families. This was the origin of the term "hussar," which means in Hungarian "the price or due of twenty." Mathias fell on the Turks, who had ravaged the country as far as Temesvar, inflicted upon them a bloody defeat, pursued them as far as Bosnia, took the stronghold Jaieza, where he liberated 10,000 Christian prisoners, and thence returned to Weisenberg, where he was crowned with the sacred crown of St. Stephen in 1464. He next suppressed the disorders of Wallachia and Moldavia; but feeling that his plans were counteracted by the intrigues of Frederick III. to gain possession of Hungary, Mathias besought the assistance of pope Pius II., but to no purpose. After a second successful campaign against the Turks, he turned his attention to the encouragement of arts and letters, and adorned his capital with the works of renowned sculptors, in addition to a library of 50,000 volumes. He sent a large staff of literary men to Italy for the purpose of obtaining copies of valuable manuscripts,* and adorned his court by the presence of the most eminent men of Italy and Germany. He was himself an author of no mean ability, and he possessed a delicate appreciation of the fine arts. At the same time the affairs of government were not neglected. The finances were brought into a flourishing condition, industry and commerce were promoted by wise legislation, and justice was strictly administered to peasant and noble alike. But the promptings of his ambition, and the pressure exercised by the Catholic party, cast an indelible blot on Mathias's otherwise spotless escutcheon; he wantonly attacked Podiebrad, his father-in-law, the Hussite king of Bohemia, and after a bloody contest of seven years' duration between these kings, the greatest generals of the age, the Hungarian power prevailed, and Moravia, Silesia, and Lusatia were wrested from Bohemia. Immediately after the conclusion of this war Mathias went to meet his old enemies, the Turks, and inflicted upon them, at Kenyérmezö (1479), such a defeat as kept them quiet for the next 46 years. After defeating an invading army of Poles, he had at length a fair opportunity for settling his differences with Frederick, and taking revenge on the insidious plotter who had imbittered his whole life. The Austrian fortresses fell before him in rapid succession. After an obstinate defense, Vienna shared the same fate (1485), and the emperor was reduced to beg his bread from village to village. Mathias now took up his residence in Vienna, but while on the pinnacle of glory he was struck down by a fit of apoplexy, and died at Vienna in 1490. To the patriotism and bravery of his father, Mathias added a taste for letters, and the highest abilities as an administrator and politician; even his secret enemy, Castelli, testifies "that for subtlety and daring he had no equal among the princes of the age.

MATHILDA, Countess of Tuscany, well known in history through her close political connection with pope Gregory VII., was a daughter of Boniface, count of Tuscany, and was born in 1046. She is said to have married Godfrey (surnamed *Il Gobbo*, or the "Hunchback"), duke of Lorraine, in 1069, by procuration; but if so, her husband did not make his appearance in Italy until 4 years after the wedding-ceremony, and the two, if they were ever united, soon afterwards separated. Godfrey went back to his duchy, and became a supporter of the emperor Henry IV., while Mathilda made herself conspicuous by the zeal with which she espoused the cause of Gregory VII. She became his inseparable associate, was ever ready to assist him in all he undertook, and to share every danger from which she could not protect him. In 1077 or 1079 she made a gift of all her goods and possessions to the church. In 1081 she alone stood by the pope, when Henry poured his troops into Italy, burning to avenge his humiliation at Canossa; she supported him with money when he was besieged in Rome; and after his death at

* Even at the present day the remains of the celebrated *Collectio Corvina* are eagerly sought after.

Salerno, boldly carried on the war against the emperor. She died at the Benedictine monastery of Polirone in 1115. Mathilda's death gave rise to new feuds between the emperor and pope Paschal III., on account of her gift to the church, which finally resulted in the former wresting from the latter a portion of Mathilda's possessions, but even what remained constituted nearly the whole of the subsequent "Patrimony of Peter."

MA'TICO, *Artanthe elongata*, a shrub of the natural order *piperaceæ*, a native of Peru, remarkable for the styptic property of its leaves, which are used for stanching wounds, and are also useful as an aromatic stimulant in mucous discharges.

MATIN DOG, a large kind of dog, now almost peculiarly French; but supposed to have been introduced into France from the n. of Europe. It is allied to the Danish dog. It has rough hair; a rather flat forehead; a rather pointed muzzle; the ears erect, but bent down at the tips. It is generally of a whitish color, clouded with brown. It is fierce, but not very courageous. Buffon, without reason, imagined it to be the original of many kinds of dog.

MATINS. See CANONICAL HOURS.

MATRICA'RIA. See CHAMOMILE.

MAT'SUMAI, a t. and port of Japan, and the largest center of commerce and population in the island of Yesso. It is on the s. coast, about 60 m. w. of Hakodadi, and contains, it is said, 60,000 inhabitants. It extends along the margin of an open bay, facing which is an island with a beacon, sheltering a harbor capable of receiving the largest ships.

MATSYS, or MESSYS, QUENTIN, 1460–1530; b. in Louvain; bred a blacksmith, early enamored with a painter's daughter, and led to become a painter. His subjects are principally religious, marked by a hard treatment in outline, but great force of expression. His "Descent from the Cross," in the Antwerp museum, was praised by sir Joshua Reynolds for heads scarcely exceeded by those of Raphael. "The Misers," which has been made familiar by engravings, is one of his noted works, which are to be found in nearly every great gallery in Europe.

MAT'TAWA, the proposed e. terminus of the Canadian Pacific railway, at the junction of the Ottawa and Mattawa rivers, in Nipissing district, Ontario, 189 m. above Ottawa. The Hudson's Bay company had a trading-fort at this point.

MATTEAWAN', a village in the t. of Fishkill, Dutchess co., N. Y., situated on the Dutchess and Columbia railroad and on Fishkill creek, 1½ m. from the Hudson, at Fishkili Landing; pop. about 2,000. It has manufactures of felt goods, hats, files, lawn-mowers, wood-working machinery, etc.; also four churches, a newspaper, and good schools.

MATTER. From a physical point of view, matter is anything that can affect the senses, or that can exert, or be acted on by, force. The existence of matter, in the sense of *substance*, has been doubted by many philosophers, including some of the greatest of experimenters. Indeed, as we can know matter only by the forces it exerts, it is obvious that the supposition of mere geometric points, capable of exerting force (technically called *centers of force*), will as satisfactorily account for all observed phenomena as any other idea of the ultimate nature of matter. Here, however, we are dealing with a question confessedly beyond the reach of experiment, and belonging to the domain with which metaphysics professes to deal. See PERCEPTION.

Although experiment cannot lead to a knowledge of the ultimate nature of matter, it may lead to important discoveries as to the arrangement of the molecules of different bodies, and their similarity or dissimilarity. Some of the questions to which we may expect an answer, though not a speedy one, have already been mentioned in the article FORCE, CONSERVATION OF; but in order to render intelligible the short account which we intend to give of some very interesting ideas recently propounded by Graham (q.v.), it will be necessary to repeat some of them.

The old idea of the transmutation of metals (see ALCHEMY) implicitly contains the assumption that all kinds of matter are ultimately one. Far from being a startling assumption, this is the simplest and most easily conceived notion we can entertain on the subject; and it offers a remarkably simple explanation of that extraordinary property of matter which Newton proved by careful experiments, that the weight of a body depends only on the quantity, not on the quality of the matter that composes it. One idea, then, of matter is, that the atoms (or smallest parts, whatever these may be) of all bodies are identical, but that the molecules (each of which is a single atom, or a definitely arranged group of atoms) differ from one body to another. Thus (to take an instance merely for *explanation*, not as at all likely to be correct), if hydrogen be supposed to consist of the simple atoms of matter; oxygen, each molecule of which is 8 times as heavy as one of hydrogen, may have each molecule formed of 8 elementary atoms, arranged in a group such as the corners of a die; carbon, 6 times as heavy per molecule, might be composed of 6 simple atoms grouped as at the corners of an octohedron; and so on. It is obvious that here each atom must be supposed capable of exerting force on every other. This leads us naturally to speculations as to the medium

through which this force, if it be exerted at a distance, is propagated (see FORCE, CONSERVATION OF); and then we have introduced matter of a more refined character than our supposed elementary atoms. This difficulty has suggested to various philosophers the idea that there is no *actio in distans*, that all pressure, for instance, in a gas is due to incessant impacts of its particles upon each other and upon the containing vessel. But from various experimental results, we know that *this* species of motion is capable of being transferred from one body to another, of being increased or diminished by change of temperature, and is, in fact, *heat* itself, one form of kinetic energy. This, if there be no ultimate difference between kinds of matter, could never be the cause of their apparent difference. Hence, in Graham's view, though all ultimate atoms are identical in substance, they have special motions of their own, by which one is distinguished from another. these motions not being capable of transfer from one atom or group of atoms to another. It is difficult to conceive energy in such a form as not to be transferable, so that we refer the reader to Graham's own papers for the further development of his theory—remarking, in conclusion, that no theory of the nature of matter can be considered as at all complete till it account for the mutual action of separate atoms; for this the existence of a *continuous* material medium in space would seem to be necessary; and this, in its turn, would, if accepted, enable us to dispense with the idea of atoms. In connection with this, we may mention that sir William Thomson has shown that more heterogeneity (which we know exists in matter), together with gravitation, is sufficient to explain all the apparently discordant laws of molecular action; matter being supposed, in this theory, to be continuous but of varying density from point to point.

MATTER (*ante*). See ATOM; ATOMIC THEORY, *ante*.

MATTER, JACQUES, 1791 1864· b. in Alsace, educated at Strasburg, Göttingen, and Paris; prof. of history and director of the college of Strasburg in 1820; in 1832, Guizot made him inspector general of studies, and of libraries in France, and counselor of the university. He was a lecturer on ecclesiastical history, a Protestant, and the author of a great number of standard works, among which are, *Histoire universelle de l'Église cretienne*, 1839; *De l'influence des moeurs sur les lois et de l'influence des lois sur les moeurs*, 1843; *Histoire des doctrines morales et politiques des trois derniers siecles*, 1837, *de l'état moral, politique, et literaire de l'Allemagne*, 1847; *Philosophy de la religion*, 1857. His treatise on the influence of manners upon law, etc., drew from the academy a special prize of 10,000 francs.

MATTERHORN (Fr. Mont Cervin; Italian, Monte Silvio), the grandest mountain mass of the Alps, located near Zermatt in Switzerland between the Canton Valais, and the Val d'Aosta in Italy. Its height is 14,805 ft., but that fact alone gives little idea of the sublimity of its abrupt rise above the great range of which it is the sentinel peak. The vast glaciers around it have their upper sources in snows at the foot of this mighty crag, which rises on its northerly face in a sheer precipice nearly 4,000 ft. above them. Seen from the pass of St. Theodule or Mont Cervin it takes the form of a craggy cone, apparently inaccessible. From the Italian side one sees its neck or comb connecting it with the rest of the range; and this side forms the only suggestion of an approach to its summit. Previous to 1858 it was deemed impossible of ascent. The professional guides of the Alps held it in awe. But English enthusiasts in mountain climbing had long looked upon its defiant steeps with longing eyes. During the summers of 1858–59 two well-organized parties attempted it and could get no further than about 2,200 ft. below its summit. In July, 1860, three young Englishmen of the name of Parker, without a guide, succeeded in mounting to the height of 12,000 feet. Prof. Tyndall in 1860–61, seems to have been possessed with a fever of desire to tread its summit; and made a series of determined attempts, in one of which he had a marvelous escape from death in an avalanche. In spite of his courage and skillful use of means he was baffled, after reaching a point 500 ft. higher than had been reached before. In July, 1862, he made a third attempt and reached the height of 13,970 ft.; but accident and the elements were against him, and again he was disappointed. It was reserved for a London engraver, August Edward Whymper, who had recently gained his first experience of mountain climbing in the French Alps, to make the first ascent to the summit: after two carefully planned but unsuccessful efforts in the summers of 1863–64, he, with a party of friends succeeded, July 15, 1865, in reaching the summit. But it ended in a fearful tragedy. Lord Francis Douglass, the Rev. Charles Hudson, Mr. Hadow, and four guides made up the party; starting from Zermatt on the 14th. While descending in fine spirits a miss-step by one of the party caused the fall of a guide, and the breaking of their connecting rope; when the three gentlemen named, and one of the best guides were hurled down the vertical face of the mountain upwards of 3,000 feet. Three days later the summit was reached from the Italian side by Jean Antoine Carrel, a professional Swiss guide, with others. Mr. Crawford Grove and party reached it in 1867. Mr. Elliot and two guides in 1868 ascended it from the north side. Prof. Tyndall ascended it about the same time from the south side, passed over its crest, and descended on the north. Its ascent is now made less perilous by a hut built at a height of 12,526 ft., and by the familiarity of guides with the most dangerous points, and the means to surmount them. Tyndall's *Hours of Exercise in the Alps* gives a vivid description of his attempts to ascend the Matterhorn in 1860–61. Whymper's *Scrambles Amongst the Alps* published in 1871 is,

however, the most remarkable book of mountain climbing ever published; and besides being devoted largely to the attempts to scale the Matterhorn, is profusely illustrated with drawings sketched and engraved by himself.

MATTEUCCI, CARLO, 1811-68; b. at Forli, Romagna, Italy; of a middle-class family; educated in the university of Bologne, and doctor of mathematics in 1829. From 1831 he devoted himself to the study of electricity and chemistry, became a friend and co-laborer of Arago, and through the influence of Humboldt was made professor of physics in the university of Pisa. He became the inventor of means of applying electric currents to the human body, and one of the most advanced investigators of the physiological effects of electricity. Among his works are: *Essai sur les phénomènes électro-physiologique des animaux*, 1840; *Traité des phénomènes électro-physiologique des animaux*, 1844. His essays in the "Philosophical Transactions" of London and in the scientific reviews of Paris, Geneva, and Italy were of high value. As a politician also his career was distinguished. As commissary under Charles Albert he sought first to avert, and then to ameliorate, the Austrian rule in Italy after the suppression of the revolution of 1848; was senator of the Tuscan assembly in 1848; commissioner to Paris on the annexation of Piedmont in 1859; member of the Italian senate in 1860; and bearer of the commission of the congress of Italy to make Victor Emmanuel king of Italy. In 1862 he had the revision of the public system of education for Italy, under the Rattazzi administration; and in 1864 published a valuable work on national instruction entitled *Lettres sur l'instruction publique*.

MATTHEW, SAINT, an apostle and evangelist, was a publican or tax-gatherer at the sea of Galilee. It is assumed by divines generally that he is the same person that Mark and Luke refer to under the name of "Levi;" but several weighty names are against this view, as, for example, Origen, Grotius, Michaelis, and Ewald. After the ascension of Christ, Matthew is found at Jerusalem; he then disappears from Scripture. Nothing whatever is known of his career.—Matthew's gospel is believed to be the first in point of time. Irenæus places its composition in the year 61 A.D.; some of the later fathers, as early as 41 A.D. The obvious design of the work is to prove the Messiahship of Jesus; hence the frequency of the expression used in regard to the acts of the Saviur, "that it might be fulfilled which was spoken by the prophet." Much controversy has been carried on regarding the language in which St. Matthew wrote his gospel. The opinion of the ancient church generally (founded on a passage in Papias, bishop of Hierapolis in the 2d c.) was that Matthew wrote it in Hebrew, or rather in that mixture of Hebrew, Chaldee, and Syriac spoken in Palestine in Christ's time, and known as Aramaic. Erasmus doubted this, and held that Matthew only wrote the one we now possess. His view was supported by Calvin, Beza, and others of the reformers; and more recently, in some form or other, by the great majority of scholars, both orthodox and heterodox. Still more recently the opinion of Bengel, that Matthew wrote first a Hebrew gospel and then translated it into Greek, has been advocated by several able writers. The passage in Papias is by no means clear, and some of the greatest grammarians and biblicists, such as Lachmann, Ewald, Meyer, Reuss, and Credner, understand it to mean that Matthew only drew up a series of notices of Christ's life and sermons, which were afterwards arranged in some sort of order by another writer. Even yet, however, the order is but dimly perceptible, and little or no attention is paid to chronological sequence. On this view the present gospel is Matthew's in substance only, and not in form. The style is comparatively tame, and even the conception of Christ, which is predominant, is earthly rather than divine. Hence the fathers called it the *Somatic*, or "bodily" gospel, as distinguished from the more spiritual gospels of Luke and John.

MATTHEW, THE EVANGELIST, is regarded by most of the ancient Christian writers, and by the best modern commentators, as identical with the publican whom Mark and Luke name Levi. If their view be correct, Matthew—signifying in Hebrew "the gift of Jehovah"—was perhaps a surname analogous to Peter as added to Simon, and to Boanerges as applied to James and John. He was early called to be a disciple, and was afterwards numbered among the twelve apostles. He was a publican, probably one of the subordinate class who were charged with collecting the taxes in a limited district. Having left all to follow Jesus, he also made him a feast in his house, at which a great multitude of publicans were present as invited guests. After the record of his choice as one of the apostles, given by three evangelists—of whom only Matthew speaks of himself as the publican—no mention is made of him in the gospels, except generally as they all speak frequently of "the twelve," and, after the departure of Judas, of "the eleven;" and in the Acts, having been mentioned once by name, he is included afterwards among "the eleven," and probably also among "the apostles." A tradition, as old as the 1st c., says that he continued in Jerusalem about 15 years after the ascension. With this accords the statement of Eusebius, made long afterwards, that he preached to his own nation before he went to foreign countries. Among the countries mentioned by other writers are Ethiopia, Persia, Macedonia, Media, and Parthia. Several of the earlier writers agree in numbering him among the few apostles who did not suffer martyrdom, though a later tradition affirms that he, too, sealed his testimony with his blood.

MATTHEW OF WESTMINSTER, an early English chronicler, who flourished in the reign of Edward II., but of whom nothing whatever is known except that he was a monk of the Benedictine abbey of Westminster. His history or chronicle is written in Latin, and is entitled *Flores Historiarum, per Matthæum Wesmonasteriensem collecti, præcipue de Rebus Brittannicis, ab Exordio Mundi, usque ad annum* 1307 (Flowers of history gathered by Matthew of Westminster, chiefly concerning the affairs of Britain, from the Beginning of the World down to the year 1307). That part which treats of English history from the conquest to the close of Edward I.'s reign is considered valuable, on account of the manifest diligence, accuracy, and honesty of the writer. The work was first printed at London in 1567, and again (with additions) at Frankfort in 1601. Bohn has published a translation into English (2 vols., 1853).

MATTHEW, GOSPEL OF, placed first in all arrangements of the four gospels, and also probably one of the first written, was from the beginning acknowledged and widely diffused as one of the canonical books of the New Testament. From Papias, who closely followed the apostles, there is continuous chain of trustworthy witnesses that Matthew the apostle wrote a gospel, and the abundant quotations in the fathers, down to Irenæus and Justin Martyr, prove that the gospel then received as his was the same as that which we have. These early witnesses agree also in saying that Matthew wrote his gospel with primary reference to the Jewish Christians of Palestine, and their statement is confirmed by internal evidence. One great object of the author plainly was to exhibit Jesus of Nazareth as the Messiah whom the types of the Old Testament prefigured and its prophets foretold. This the opening sentence of his gospel shows, declaring Jesus Christ to be the son of David and of Abraham, and this the advancing chapters, recording events as "realized prophecy," keep constantly in mind. Still no evangelist exhibits more clearly also the ultimately universal diffusion of the gospel message through the world. Even the beginning of the ministry of Jesus, as Matthew records it, gave light not only to Jews, but also to Galilee of the Gentiles; and, at the close, the first gospel gives, equally with the second and third, the universal command, "Go ye and make disciples of all nations." The general testimony of the early writers is that Matthew wrote his gospel in Aramaic; that is, in the dialect of the Hebrew which was then spoken in Palestine. Yet, while all the fathers of the church assert the Hebrew origin of the gospel, as Olshausen remarks, "They, without exception, make use of the existing Greek text as canonical Scripture, and that without doubt or question, or anything that would lead to the belief that they regarded it as of less authority than the original Hebrew, or possessed it in any other form than that which we now have." And if the Hebrew gospel had ever been clothed with supreme authority as the only one written by Matthew, a Greek translation could not have been substituted for it without opposition, or without leaving some traces of the process by which it had been done. But nothing of the sort occurred. The Greek text itself also, according to the judgment of careful critics, presents no marks of being a translation, but many of being an original work. The correspondence of the Greek text with the Greek of Mark and of Luke points also to a Greek original. All the ancient versions also, even the Peshito Syraic—the very language which corresponds with the Aramaic—were taken from the present Greek text. The summing up of the testimony, therefore, favors two originals, both from Matthew, both used at first as occasion required, and the Greek, diffused abroad much more widely, finally remaining alone in circulation and use. That a full account of the life of Jesus should be needed at first among the Jews, in both Hebrew and Greek, is illustrated by Pilate's action in writing above the cross, in three languages, the single declaration, "This is Jesus, the king of the Jews, and by the apostle John's record that one reason why many of the Jews read the title was that it was written in Hebrew, Greek, and Latin.

The contents of the gospel may be divided into eleven sections: I.—The ministry of Jesus: Chapters i.-iv. containing his genealogy, coming down from Abraham, and his birth at Bethlehem; the visit of the wise men, the flight into Egypt and the return; the ministry of John, the baptism of Jesus, followed by the descent of the Spirit and the voice from heaven; the temptation of Jesus, the beginning of his ministry, the calling of his first four disciples, and his first circuit in Galilee, accompanied with an outburst of power over all kinds of disease. II.—The new law given in the sermon on the mount, v.-vii.: The beatitudes; his disciples compared to the salt of the earth and the light of the world; the law and the prophets to be fulfilled; new expositions of various commandments; directions for alms-giving, for prayer—of which a model is given in "the Lord's Prayer"—and for fasting; counsels against laying up earthly treasures, and against anxious thought; command not to judge others or to mark their faults; counsel not to cast pearls before swine; promise that prayer shall be answered; the "golden rule" given; exhortation to enter the strait gate and narrow way; warning against false prophets and false professors; the emblem of houses built on the rock and on the sand. III.—Record of events exhibiting Jesus as a doer of mighty works, viii., ix.: The leper cleansed; the centurion's servant healed; Peter's mother-in-law cured; multitudes of sick persons healed and many demons cast out; the storm on the lake calmed; the legion of demons cast out of the man and allowed to enter the swine; the man sick of the palsy forgiven and healed; Matthew called and publicans and sinners received; the woman

that touched his garment healed, and the ruler's daughter raised; the two blind men restored and the dumb demon cast out; the second circuit of Galilee and the general cure of sickness and disease. IV.—The choice of the twelve apostles, x.: Their names given and the varied instructions to them recorded. V.—Doubts expressed and opposition exhibited, xi., xii.: The inquiry sent by John from the prison, the answer returned, the testimony of Jesus concerning him; the unrepenting cities condemned; thanksgiving to the Father· invitation to the weary; authority claimed over the Sabbath, the withered hand healed, the Pharisees silenced, and their council against him; his withdrawal, followed by the healing of great multitudes; a demon, blind and dumb, cast out; the opposition of the Pharisees and their consequent condemnation. VI.—Parables relating to the kingdom of heaven, xiii.: 1–52: Of the sower; the tares among the wheat; the mustard seed; the leaven; the treasure hid in the field; the pearl of great price; and the net cast into the sea. VII.—Effects of the ministry of Jesus on various classes of people, xiii.: 53—xvi.: 12: On the inhabitants of Nazareth; on Herod, explained by his treatment of John the Baptist; on the men of Gennesaret; the multitudes whom he feeds; the Pharisees and Scribes; the woman of Canaan. VIII.—Revelation concerning his divine nature and his sufferings, with instructions to the disciples, xvi.: 13—xviii.: Simon Peter's confession of faith in him; his sufferings foretold; his transfiguration, followed by the casting out of a demon from a child; the temple-tax paid; instructions concerning humility, illustrated by a child, and concerning forgiveness, enforced by the parable of the debtors. IX.—Events during the journey from Galilee to Jerusalem, xix.–xxiii.: Law concerning divorce; benediction on little children; answer to the inquiry concerning the attainment of eternal life, and rewards promised to the disciples; parables concerning the laborers in the vineyard; his sufferings again foretold; the ambitious request of James and John; two blind men restored to sight; the entrance into Jerusalem; the cleansing of the temple; the hosannas of the children; the fig-tree withered; the chief priests and elders silenced; the parables of the two sons and the vineyard, of the husbandmen and the vineyard, and of the marriage of the king's son; the hypocritical question of the Pharisees, the scoffing question of the Sadducees, the earnest question of the lawyer, and the silencing question of Jesus; woes pronounced on the Pharisees and on Jerusalem. X.—Last discourses, xxiv., xxv.· The destruction of the temple foretold to be attended and followed by wars, tribulations, false Christs and prophets, and, at some unknown time, by the coming of the Son of Man; the suddenness of his coming compared to the flood and enforced by the parables of the servant and his lord, of the virgins and their lamps, of the talents, and of the shepherd dividing the sheep from the goats. XI.—The crucifixion, burial, resurrection, and final commission to the disciples.

MATTHEW PARIS, or MATTHEW OF PARIS. See PARIS, MATTHEW, *ante*.

MATTHEWS, a co. in e. central Virginia; pop., '80, 7,501—2,424 colored. The form of the co. is that of a peninsula, the Chesapeake bay lying on the e., Mobjack bay on the s., and Piankatank river on the n. and n.west. The soil is naturally sandy and the staples are Indian corn and pork. There is some manufacturing and fishing. Chief town, Matthews Court House.

MATTHEWS, GEORGE, 1739–1812; b. in Augusta co., Va.; served with great distinction in the revolutionary war; received nine wounds in the battle of Germantown and was taken prisoner. In 1785 he removed to Oglethorpe co., Ga., and was governor of that state 1793–96; member of congress 1789–91; engaged in military operations in Florida in 1811, with the rank of brig.gen. of militia.

MATTHEWS, JOHN, 1744–1802; b. S. C.; distinguished for patriotism during the revolutionary war; speaker at one time of the South Carolina house of representatives; associate justice of the supreme court in 1776; member of congress in 1778–82; governor of South Carolina in 1782–83; and in 1784 a judge of the court of equity. Died at Charleston.

MATTHIAS, SAINT, one of the 70 disciples, chosen an apostle by lot to fill the place vacated by the treachery and suicide of Judas. Of his origin, family, history, the scene of his labors, the date and place of his death, nothing is known, nor is there any tradition on which reliance can be placed.

MATTHIAS, Emperor of Germany, 1557–1619; son of Maximilian II., and grandson of Charles V. His eldest brother, Rudolf II., had succeeded to the throne upon the death of their father. Rudolf resented the influence exerted by Matthias in the affairs of the German empire, and the latter, to strengthen himself in another quarter, became the champion of the Netherlands, in whose affairs he exercised a great authority till 1580, when he was compelled to give way to the ascendancy of the prince of Orange. Upon the death, in 1595, of his brother Ernest, archduke of Austria, he governed the archduchy, where the principal feature of his administration was his persecution of the Protestants. In 1606 he restored order in Hungary, which had formed a coalition with Turkey and Transylvania against the Hapsburgs. Two years later, with the aid of a league which he had formed between Hungary, Silesia, and Moravia, he forced upon Rudolf the cession of Austria, Hungary, and Moravia, and at the same time, was guaranteed the succession to the Bohemian crown. Matthias afterwards allied himself with the Bohemians who were then in revolt, and compelled Rudolf to cede him Silesia and

Lusatia, in addition to Bohemia. Rudolf died without issue in 1612, and Matthias was at once chosen his successor. The Turks had invaded Hungary, and Matthias, who was able to offer them no substantial resistance, was compelled to sue for peace. In the later days of his Austrian administration, he had made overtures to the Protestants, whom he had formerly persecuted; and he had encouraged the Jesuits. He soon found himself in conflict with both. A Protestant league had been established in 1608, of which the count palatine Frederic IV. was chief; and a counter Roman Catholic league had been organized in 1609. Matthias attempted to bring the latter, which was then under Bavarian management, under Austrian influence; and failing in this, framed a decree against both the Roman Catholic and Protestant leagues. The decree failed of its effect, neither league paying any attention to it. The administration of Matthias had proved a failure, and he made of his ill health an excuse for withdrawing from public affairs. In 1617 he made the archduke Ferdinand, afterward the emperor Ferdinand II., king of Bohemia; and the next year, substituted him for himself, on the throne of Hungary. The Bohemians revolted against Ferdinand, enraged by the severity of his religious persecutions; the insurrection at Prague, in 1618, gave the signal for the outbreak of the thirty years' war, and the last days of Matthias were embittered, not only by his own failure, but by the reverses which the Bohemians inflicted upon Ferdinand.

MATTHIAS I., THE GREAT. See MATTHIAS CORVINUS, *ante*.

MATTHIAS, b. Washington co., N. Y., in 1790; a religious fanatic and impostor. His real name was ROBERT MATTHEWS. He kept a country store, and having failed in 1816, removed to New York. In 1827 he resided in Albany, and became much excited by the preaching of the Rev. Drs. Kirk and Finney. He was very earnest in the temperance cause, claimed to have received a divine revelation, and commenced street preaching, endeavoring to convert the city of Albany. His preaching being unsuccessful, he predicted the destruction of the city, and went secretly to New York where he deluded several respectable people. Being accused of poisoning one of his wealthy disciples in whose family he lived, he was tried and acquitted. After the exposure of his impostures he left and is said to have died in Arkansas. W. L. Stone of New York published *Matthias and his Imposture*.

MATTHIAS, OR MATTHIESEN, JOHN. See ANABAPTISTS, *ante*.

MATTHISSON, FREDERIC VON, 1761-1831; b. Germany; educated at the school in Klosterbergen, and studied theology at Halle. He had been educated by his grandfather, a Protestant minister, with a view to entering the church, but his fondness for literature led him to give up his design of taking orders, and he took private pupils at Heidelberg and Mannheim. After passing two years near lake Geneva, where he enjoyed the society of the philosopher Bonstetten, he became private tutor to the son of a merchant in Lyons. He returned to Germany in 1792, and two years later was appointed reader to the princess of Anhalt. He accompanied her in her travels through Switzerland, the Tyrol, and Italy, and upon her death in 1812 was taken into favor by the king of Würtemberg. Attached to the suite of the duke of Würtemberg, he revisited Italy in 1819, and resided for some time at Florence. He is one of the most popular of the German lyric poets, and as a prose writer holds a respectable rank. His complete works including his earlier *Schriften und Erinnerungen* were published at Zurich, 1825–29. His verse is smooth and melodious, dwelling with predilection on pictures of rural life, and animated by a gentle fancy. One of the best of his lyrical pieces, his *Adelaide*, was set to music by Beethoven. Besides his original work, he made a selection from the lyrical German poets, which was published at Zurich in 20 vols., 1803–7. His posthumous works were collected and published in 1832.

MATTISON, HIRAM, D.D., a distinguished divine of the Methodist Episcopal church; 1811–68; b. Norway, Herkimer co. N. Y. The first years of his early manhood were spent in teaching, but at the age of twenty-three his mind turned to the ministry, and in 1836 he entered the Black River conference; was stationed at Watertown and Rome; in 1850 and 1852 was made secretary of the conference; removed in 1852 for his health to New York; was pastor of John street church, and afterwards of Trinity M. E. church in 34th street, which he organized. He labored with great earnestness to persuade the general conference in 1860 to take action against all slaveholding in the church; but failing in this he withdrew from the Methodist Episcopal church, Nov. 1, 1861, and became pastor in St. John's Independent Methodist church. He returned in 1865 to the denomination that he had left, and was appointed to Trinity M. E. church in Jersey City, where he died. The last year of his life he was cor. secretary of the American and Foreign Christian union. Dr. Mattison was an eloquent preacher. He wrote with great rapidity, and his works were numerous. The following are some of the most prominent of his published works: *A Scriptural Defense of the Doctrine of the Trinity; Tracts for the Times; Elementary Astronomy, accompanied with Maps;* in 1850 an improved edition of *Burritt's Geography of the Heavens; High School Astronomy; Spirit-rapping unveiled; The Wesleyan Doctrine of Perfection; Sacred Melodies; Minister's Pocket Manual; Impending Crisis; Immortality of the Soul and Resurrection of the Body; Select Lessons from the Holy Scriptures; Defense of American Methodism; Popular Amusements.* He left an unfinished treatise on *Depravity in its Relation to Entire Sanctification;* and the outlines of other

theological works. His contributions to the periodical press were numerous and valuable. He was the author of several poems of merit.

MAT'TO or **MATO GROS'SO** (*dense forest*), a province of Brazil, bordering on Bolivia. Area 550,000 sq.m.; population estimated at 100,000, mostly Indians. Chief rivers, the Madeira, Juruema, and Paraguay, with their numerous affluents. Its soil is fertile, but there is almost no cultivation. Dense forests cover immense tracts of the country. Gold and diamonds abound, and indeed the mineral riches of the province have hitherto formed the chief barrier to its progress. Diamonds, gold, hides, balsams, ipecacuanha, and other drugs, are the exports. Manufactured goods are imported.

MATTOON, EBENEZER, 1755–1843; b. Amherst, Mass., and graduated at Dartmouth in 1776; joined the revolutionary army, served as lieut. of artillery in the battle of Bemis Heights in 1777, and was promoted to the rank of major. After the war he settled in his native town as a farmer; was often elected to the legislature, and for 20 years served as sheriff of Hampshire co.; member of congress in 1801–3; maj.gen. of state militia from 1797 to 1816, and adj.gen. in the latter year; col. of the ancient and honorable artillery company of Boston in 1817, and member of the Massachusetts constitutional convention of 1820. During nearly 25 of the last years of his life he was blind.

MATURIN, CHARLES ROBERT, 1782–1824; b. Dublin, Ireland; educated at Trinity college. He took orders in the Anglican church, became curate of St. Peters, and as a preacher is said to have been eloquent and impressive, but is chiefly known as a romancist and dramatic writer. His most noted novels are *Fatal Revenge*, (1807); *Milesian Chief; Women, or Pour et Contre;* and *Melmoth, the Wanderer*. All and especially the last named are of that lurid and sensational style, blending the supernatural and the horrible, to which the works of Mrs. Radcliffe and Monk Lewis had accustomed the public in the early part of the century. That Maturin was possessed of genius cannot be denied; but it was for the most part misdirected, and, of the elements now considered requisite among first-class writers of fiction, vigor and a vivid imagination were the only traits to be found in his work. As a dramatist his only successful production was *Bertram*, a wild and uneven tragedy marked by most of the characteristics of the novels. This was produced in 1816 under the patronage of Scott and Byron, and met with brilliant success, the author clearing £1000. In his later years, like too many of his contemporaries, Maturin was in continual financial embarrassment.

MAUBEUGE, a fortified t. in the n. of France upon the river Sambre; pop. about 14,000. It has manufactures of iron bars, hardware, marble, beer, and linen thread; and commerce in slates, oils, marble, and iron. The town was founded in the year 650. It has been by turns under the rule of Spain, Germany, England, and France; was captured and burned in 1477 by Louis XI.; in 1543 by the son of Francis I., in the war with Charles V., and again burned; in 1553 by Henry II., and again burned. In 1637 it was subject to the governor of the Low Countries; in 1680 Louis XIV. caused it to be refortified; in 1815 it fell into the hands of the allies, and was held by Russia till 1818.

MAUCH CHUNK, a borough of Pennsylvania, capital of Carbon co.; situated on the Lehigh river, at the point where it passes through the Mahoning mountain; pop. of township, '70, 5,210; of borough, 3,841. It is on the Lehigh Valley railroad, the New Jersey Central railroad, and the Lehigh canal; is distant from Philadelphia 89 m.; from New York, 121 miles. This point forms the eastern extremity of the southern anthracite coal region of Pennsylvania, while its situation and surroundings are picturesque and romantic in the extreme, and cause it to be very generally visited as a summer resort by tourists in search of striking natural scenery. Nine m. west of the village are the Summit Hill coal mines, which are celebrated as among the most productive in the state. The coal was formerly carried thence by means of a gravity railroad, called the "Switchback," to Mauch Chunk, the cars returning by a similar road to the mines; this road is now used for tourists and excursions, and the coal is transported through a tunnel. The borough is extensively built up with fine residences, and contains several public institutions, churches, and schools. Mount Pisgah, and mount Jefferson, ascended by the road already mentioned, are points for the attention of excursionists, from which can be gained a magnificent view of the Lehigh valley and the surrounding scenery. Summit Hill offers a special attraction in a burning mine which has been on fire since 1832. Glen Onoko is another and more fascinating place of resort, two miles from the village.

MAUCHLINE, a t. in the co. of Ayr, Scotland, is pleasantly situated, and is surrounded by a picturesque country. Mauchline has long been noted for the making of a beautiful description of snuff-boxes, cigar-cases, and other articles of that kind of manufacture. The buildings of the town are neat, and possess a pleasing variety. Standing, as Mauchline does, on the river Ayr, the bridges in the neighborhood attract attention, one of which, at Barskimming, is a structure of considerable elegance, consisting of a single arch 100 ft. wide and 90 ft. high. In the vicinity is Mauchline castle, formerly possessed by the Loudon family, who had a right to the title viscount Mauchline; there is also the green on which a stone commemorates the death of five Covenanters in 1685. Robert Burns spent nine years of his life at the farm of Mossgiel, about half a mile to the n. of Mauchline. The cottage of "Poosie Nancy," theater of the "Jolly Beg-

gars," and Mauchline Kirk, the scene of the "Holy Fair," are in the town. The population in 1871 was 1574.

MAUDSLEY, HENRY; b. England, 1835; educated at University college, London, where he took a course of medical study. He received the degree of M.D. from the university of London, in 1857, and soon after became physician to the Manchester royal lunatic hospital, where he remained till 1862. He was elected a fellow of the royal college of physicians and surgeons in 1869, to which he became Gulstonian lecturer in 1870. Dr. Maudsley is editor of the *Journal of Mental Science*, and has made a specialty of the study of lunacy, and mental diseases. He has published *The Physiology and Pathology of Mind; Body and Mind; Responsibility in Mental Disease*. He is now professor of medical jurisprudence in University college, London, and consulting physician to the West London hospital.

MAUDUIT, ISRAEL, 1708–87; b. Exeter, England; educated for a dissenting minister, but never entered the profession; went into mercantile business with a brother and accumulated a fortune, and in 1763 was appointed to represent the interests of the province of Massachusetts, of which his brother Jasper was the nominal agent. He was made collector of Southampton in 1765; espoused the cause of the colonies in the discussions preceding the revolution, writing several pamphlets upon the subject; at a later day defended with his pen the cause of American independence, calling lord Howe and sir William Howe to severe account.

MAUDUIT DUPLESSIS, THOMAS ANTOINE, Chevalier de, 1753–91; b. France. He joined Rochambeau's fleet sent to help the United States in the war for independence. In 1787 he was made commandant of Port-au-Prince. On the receipt of the decree of the French national assembly freeing the slaves, he refused to execute their orders, leagued with the governor against the authority of the French republic, dissolved the colonial assembly, formed a "royal corps" nick-named the *pompom blancs*, and succeeded by the arbitrary violence of his measures in opposition to the home government, in producing a counter revolution in which he was killed.

MAUI. See SANDWICH ISLANDS.

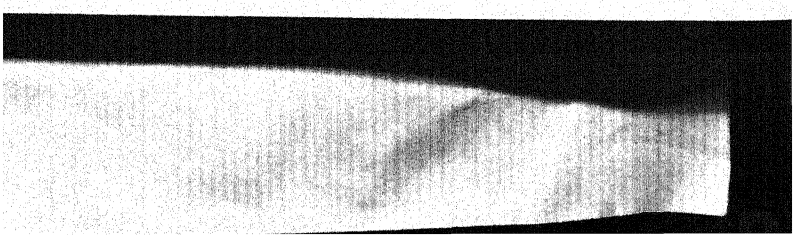
MAU'LE, a province of Chili lying between Itata and Maule rivers, and bounded by the districts of Talca, Senares, Nuble, and by the sea; 2,918 sq.m.; pop. 118,474. The soil is rolling but fertile; the staples are grain, wine, tobacco, and cattle. Wine and tobacco are exported to some extent. Chief towns are Cauquenes and Constitucion, the first being the capital and the latter a place of extensive trade, mainly with Valparaiso. The province has one railroad reaching from Chillan to Curico.

MAU'LE RIVER, rises in the Andes mountains, not far from the peak of Descabezado, and after flowing for over 150 m. in a westerly direction through Chili, empties into the Pacific about 100 m. n.e. of Concepcion and near Constitucion. It is navigable for only a few miles. It has several branches of which the chief is the Guanutil.

MAULMAIN'. See MOULMEIN.

MAUMEE BAY, at the w. end of lake Erie, and at the mouth of the Maumee river; a shallow body of water about 8 m. in diameter each way, inclosed by North point on the n., and Cedar point on the south. A light house on Turtle island between these points lights the entrance to the bay. The channel to the mouth of the Maumee is from 12 to 14 ft. in depth, was formerly very tortuous; but the government appropriations have greatly improved it of late years. Range lights have been placed on both shores to facilitate navigation. The shores are generally marshy, and afford some of the finest places for hunting water fowl in the country. The Toledo sporting association control the marshes of Cedar point for the purpose of duck hunting. On one of the northern bayous of the bay is a sulphur spring of great volume, forming a beautiful basin in the marsh, approached by skiffs only.

MAUMEE RIVER formed by the confluence, at Fort Wayne, Indiana, of the Anglaize and St. Mary's river, and flowing thence 100 m. e.n.e. to its mouth in the Maumee bay at the w. end of lake Erie. For 12 m. above its mouth it is an estuary of the lake; its waters rising and falling as the winds shift from e. to west. Its breadth in this part is from one third of a m. to a m.: its channel from 12 to 30 ft. in depth. Toledo, its commercial mart, is 4 m. from its mouth; and up to this point the channel is usually 14 ft. deep; above Toledo 10 feet. The rapids of the Maumee meet the slack water of the lake 12 m. above the mouth, are 18 m. long, with an average fall of about 4 ft. to the mile. The river from the foot of the rapids to Fort Wayne is from 400 to 100 yards wide; above the rapids its slack water is used as a part of the way for the Wabash and Miami, and Erie canals, and furnishes water for the locks down to their terminus at Toledo. The shores are low near the lake, and increase in height to the foot of the rapids, where they are 60 ft. high. Above Toledo, and below the rapids, the river is studded with low islands which, with its banks, once beautifully wooded, made a valley of great beauty. The scenery along the rapids is also beautiful. The volume of water in the river varies from spring to mid-summer like that of a mountain stream; though throughout its whole course, it flows through a flat alluvial country. In summer the rapids are frequently almost dry; yet the spring freshets are tremendous. The last



one in Feb., 1881, in conjunction with fields of unbroken ice below Toledo, and e. winds driving the water of the lake into the open funnel formed by the narrowing width of the lake, bay, and river, caused a greater rise than ever before known; inundating all the river front of the city. The reason for this unequal volume of its water is found in the capacity of the alluvial soil to absorb the summer rain falls more and more as the area of cultivation widens; while in winter the frozen ground prevents such absorption and empties a large part of the precipitation into its bed.

MAUNA KEA, the highest mountain in Polynesia. It occupies the n. and n. central portions of Hawaii, and its height was estimated by the U. S. exploring expedition to be 13,953 feet. It is an extinct volcano. During most of the year snow lies on its peaks, which are composed of gravel and reddish scoria. Its sides are covered with forests, where wild cattle range and are hunted for their horns, hides, and tallow.

MAUNA LOA, a volcanic mountain which occupies much of the central and southern portion of Hawaii. From the sea it appears domelike in shape, of no great elevation, and with very gradual slopes, partly covered with forests and sometimes crowned with snow. The top of the mountain is one expanse of lava, in some parts smooth and solid, in others cellular and scraggy. No ashes, rocks or sand are seen. Its terminal crater, called Mo Ruaweo-weo, is near 15,000 ft in length and 8,000 in breadth, the nearly perpendicular walls of its interior being in 1864 1000 ft. deep. In its quiet period the bottom is traversed by ridges from 10 to 50 ft. high, by deep chasms, beds of smooth lava, and fissures through which steam and smoke escape. The crater of Kilauea, the largest known in the world, is on the s.e. side of the mountain. It is 3¼ m. long, 2½ wide, 1044 ft. deep. At the depth of 650 ft. a ledge of black, hard lava from 600 to 2,000 ft. in width has accumulated around the sides of the cauldron, within which billows of liquid fire toss and rage. Even when comparatively inactive, red hot lava is occasionally thrown up to the height of 60 or 70 feet. In times of eruption a crater will sometimes fill with melted lava and overflow; or the internal fires will make for themselves new vent by forming fresh craters; or they will form lava fountains, throwing up continuous jets of molten material, and receiving them again in their raging depths. A sunken crater 38 ft. deep by 200 in diameter (called by lieut. Wilkes Judd's lake, from the fact that Dr. Judd, who accompanied him, was overtaken while in the crater by a sudden eruption and narrowly escaped death) discharged in 1841 by estimate 200,000,000 cubic ft. of lava. An eruption in 1855 lasted 13 months, and discharged lava over 300 sq.m. of territory. In Jan, 1859, three new craters opened in the side of the mountain, one of which, 1000 ft. in diameter, threw up a column of white hot fluid lava from 200 to 300 ft. high, continuing to play for four or five days, and illuminating the sea for 150 miles. This crater discharged itself through a subterraneous passage, and a half mile distant came to the surface and leaping a precipice of 50 ft. spread by numerous streams over the slope of the mountain, and reached the sea 40 m. from the crater in five days still at a light red heat. The meeting of the lava and the waves produced a scene terrific beyond imagination. The lava continued to flow from January to November.

MAUNDRELL, HENRY, an English traveler; 1650–1710; b. England; visited Palestine in 1697; was for several years chaplain to the English factory at Aleppo, Syria. He published in 1698, *Journey from Aleppo to Jerusalem*, a valuable work often reprinted, translated into French.

MAUNDY-THURSDAY, the Thursday of Holy Week (q.v.). The name is derived from *mandatum*, the first word of the service chanted at the washing the feet of pilgrims on that day, which is taken from John xiii. 34. The washing of the pilgrims' feet is of very ancient usage, being referred to by St. Augustine; and, both in ancient and modern times, it was accompanied by a distribution of "doles," which were handed to the pilgrims in small baskets, thence called "maunds." In the royal usage of the maund in England, the number of doles distributed was reckoned by the years of the monarch. They are usually given by the lord high almoner; but James II. performed the ceremony in person. The distribution of doles was retained till the year 1838, since which period the "Maundy" men and women receive a money-payment from the clerk of the almonry office, instead of the dole. In most mediæval countries, the maund was held in all the great houses; and in England, in the household book of the earl of Northumberland, which begins in 1512, there are entries of "al maner of things yerly yevin by my lorde of his Maundy and my laidis and his lordshippis childeren."

MAUPERTUIS, PIERRE LOUIS MOREAU DE, a French mathematician, was b. at St. Malo in 1698. He early displayed a love of mathematics, and after serving in the army for five years, withdrew from it to pursue his favorite studies. His able advocacy of Newton's physical theory, in opposition to that of Descartes, gained him general favor in Britain, and he was admitted to the royal society of London in 1727. In 1736 he was placed at the head of the academicians whom Louis XV. sent to Lapland, to obtain the exact measurement of a degree of longitude, whilst the same thing was also being done in Peru by Condamine. This operation he described in his work, *De la Figure de la Terre, déterminée par les Observations de MM. Clairaut, Camus*, etc. (Par. 1738). In 1740 he went to Berlin, on the invitation of Frederick II., to be president of the academy there; but having accompanied the Prussian army to the field, was taken prisoner at Mollwitz.

by the Austrian hussars, and sent to Vienna in 1741. He returned to Berlin shortly afterwards, and resumed his former office; but his morbid *amour-propre* and tyrannical disposition excited general dislike. Among others, Maupertuis attacked Voltaire; but the latter applied the lash of satire so vigorously, that Maupertuis was perforce compelled to return to France in 1756. In 1758, he went to Basel, for the sake of his health, and to enjoy the society of the Bernouillis, but died soon after, July 27, 1759. Maupertuis was a mathematician of ordinary ability, but a very inferior philosopher, and owed his celebrity more to the idiosyncrasies of his manners and disposition than to his merit.

MAUREPAS, JEAN FREDERIC PHELYPEAUX, Comte de, 1701–81; a minister of state in the reigns of Louis XV. and XVI. of France. The office was hereditary in his family, and embraced the affairs of the royal household, the government of Paris, and of the Marine. It fell to Maurepas at the age of 14, but was administered during his minority by the marquis de Vrilliére. Maurepas became, in fact, minister of Marine in 1723, and secretary of state in 1738. Neither great, learned, neither eminently good, or bad, he was yet a remarkable minister by virtue of an adroitness of character, and a tact in managing men, and fitting his action to the events which he could not control, that makes his long term of service interesting to the French historian and biographer. When the unfortunate Louis XVI. came to the throne, Maurepas was called from retirement to his councils. Through his influence, largely, the government made the alliance with the United States and declared war with England. He secured the entrance of Turgot and Neckar to the royal ministry, and afterwards when he found them in his way secured their dismissal. A French biographer sums him up as "the most quick-witted, charming, and seductive of ministers." Facetious writings to which Maurepas is said to have contributed, have been published under the title of *d'Etrennes de la St. Jean, d'Etrennes de la St. Martin, et de Recueil de ces messieurs.* Curious memoirs by Solavil, purporting to be of Maurepas, were published in four volumes, 1790–92.

MAURER, GEORGE LUDWIG von, 1790–1872, b. Bavaria; educated at Heidelberg, where he studied jurisprudence, to which he afterwards devoted himself, in Paris. In 1826, after holding some minor offices, he was appointed a professor at Munich. From 1832 to 1834, he had a seat in the council of regency at Athens, where he formed a code. In 1847, having been previously appointed to the council of state, he was minister of foreign affairs and justice. The most valuable, perhaps, of his various works on history and jurisprudence are, *Das Griechische Volk*, 1836; and *Geschichte der Städteverfassung in Deutschland*, 1871.

MAURER, KONRAD, b. Germany, 1823; a son of Georg Ludwig. He was appointed professor of jurisprudence at Heidelberg, in 1847, but has devoted himself specially to the cultivation of the Norse language and literature, and the jurisprudence and history of the Scandinavian peoples. Besides editing some of the Icelandic sagas, he has published *The Origin and Constitution of the Icelandic State*, Munich, 1852; and *The Conversion of the Norwegian race to Christianity*, 2 vols., 1855–56.

MAURICE, PRINCE OF ORANGE and COUNT OF NASSAU, one of the most skillful and distinguished generals of his age, was the son of William I., prince of Orange, and was b. at Dillenburg, Nov. 14, 1567. After his father's assassination in 1584, the provinces of Holland and Zealand, and afterward Utrecht, elected him their stadtholder. A great portion of the Netherlands were still in the hands of the Spaniards; but under the admirable leadership of Maurice, the Dutch rapidly wrested cities and fortresses from their enemies. In 1591, Zutphen, Deventer, Nimeguen, and other places fell into their hands; in 1593, Gertruydenberg; and in 1594, Gröningen. In 1597, with the help of some English auxiliaries, he defeated the Spaniards at Turnhout in Brabant, and in 1600 won a splendid victory at Nieuport. Finally, in 1609, Spain was compelled to acknowledge the United Provinces as a free republic. The ambition of Maurice, however, was excited to the desire of sovereignty; but in this, notwithstanding the love and respect with which he was regarded by the people, he finally failed. See BARNEVELDT. He died at the Hague, April 23, 1625.

MAURICE, (DUKE and afterwards ELECTOR) OF SAXONY, eldest son of duke Henry of the Albertine line (see SAXONY), and nephew of duke George (q. v.) the bearded, the most bitter opponent of the reformation, was b. at Freiberg, March 21, 1521; espoused, in 1541, Agnes, daughter of the landgraf Philip of Hesse; and later in the same year, succeeded his father in the duchy of Saxony and its dependencies. He was hardly well established in his dominions, till a dispute arose between him and his cousin, the elector John Frederic, regarding their respective rights over the bishopric of Meissen, which was the common property of the Ernestine and Albertine lines; but by the influence of Luther and of the landgraf Philip, a temporary reconciliation was effected. Maurice took part in the campaign of 1542 against the Turks in Hungary, and gave such signal proof of military talent, that the emperor on his return eagerly pressed him to accept a command in the armies on the western frontier of Germany. Maurice was nothing loath to continue his military career, but insisted on obtaining the protectorate of the bishoprics of Magdeburg and Halberstadt, in recompense of his services; a stipulation to which Charles would not consent. Maurice accordingly returned to his duchy, and though still on the

most friendly terms with the emperor, took part in the deliberations of the Protestant league of Schmalkald (q. v.), being himself a professed Protestant, and the son-in-law of one of the chiefs of the league. He refused, however, though agreeing with the objects of the league, to become a member; and the judicious gift to him by the emperor of the much-coveted protectorate above mentioned, and subsequently (June 19, 1546), a solemn deed of the emperor at Ratisbon, by which the Ernestine portion of Saxony and the electoral title were transferred from John Frederic to Maurice, secured the latter's energetic support. When Charles, at the commencement of the war, was cooped up in southern Germany by the army of the league, Maurice, by invading the Saxon electorate, compelled the Protestants to retire northwards, thus relieving the emperor, and enabling him to subdue Swabia and the upper Rhine districts. But by this maneuver he drew an overwhelming attack upon himself, and was driven by the incensed John Frederic from the electorate, deprived of his own dominions, and reduced to extremity. At this critical moment, the emperor came to his aid; and Maurice and the duke of Alva (see ALBA), at the battle of Muhlberg, annihilated the elector's army and took himself prisoner. Maurice was now, in accordance with the previous agreement, ruler of the whole of Saxony, with the electoral dignity; and having obtained from the emperor all the gratification of his ambitious desires which could be hoped for from that quarter, their friendly relations became more dependent upon the course of events. The retention in confinement of Philip of Hesse, whom Maurice had prevailed upon to submit to the emperor, was the first cause of estrangement; the incessant attempts of the emperor to increase, by modifications of the imperial system, his own preponderance in Germany, supplied another; and though the new elector zealously supported the interim (q. v.) of Augsburg in 1547, he gradually came to see that his close alliance with the emperor was alienating from him the affections of his Protestant subjects.

He accordingly at once abandoned the cause of the emperor with as little scruple as he had formerly sacrificed the interests of his relatives and co-religionists; and, in common with the princes of Kulmbach and Hesse, secretly sent (May, 1551) agents to Paris and London to negotiate an alliance against Charles V., while he leisurely carried on the siege of the rebellious city of Magdeburg, in order to have a pretext for keeping an army afoot. Meanwhile, Charles, at Innsbruck, was employing himself in building up vast schemes of ambition, little dreaming of the mine which the man whom he most of all confided in was preparing to spring under his feet; till the manifesto, or rather ultimatum of the Protestant princes, in which they demanded the release of Philip of Hesse, and the total abolition of the arbitrary authority of the imperial government; and the capture by them of Augsburg, while their allies, the French, took Metz; rudely drew away the veil from his eyes. Without money, without troops, without allies, nothing but a secret flight from Innsbruck appeared open to him; but he had only got as far as Füssen (a town on the Lech, on the borders of Bavaria and the Tyrol), when the news that Maurice was marching in this direction forced him to hasten again to Innsbruck. On April 18, by the mediation of Ferdinand, king of Romans, a treaty was concluded at Linz granting the demands of the Protestants; but as it was not to take effect till May 26, Maurice employed himself in attacking (May 18) the camp of Reitti, in which soldiers were being assembled for the emperor, defeated and wholly dispersed the imperialists, and advanced on Innsbruck with the view of taking Charles captive, when his progress was stopped by a mutiny in his army; and the emperor escaped. His advance on Innsbruck so alarmed the members of the council of Trent that they fled from the town, and the sittings were thenceforth suspended for some years. Finally, at a convocation of the electors and princes of the empire at Passau, the terms of a treaty of peace were discussed, Maurice directing the cause of the Protestants, and Ferdinand attending to the imperial interests; and it was ultimately agreed that Protestants were free to exercise their mode of worship; that the imperial chamber, from which Lutherans were not to be excluded, should render justice irrespective of religion; and that the Aulic council should be composed exclusively of German ministers. These conditions, which in political matters secured "Germany for the Germans," and in religious affairs permanently established the principles of toleration, were embodied in the agreement called the *Peace of Passau* (Aug. 22, 1552). The bitter dislike conceived by the emperor towards Maurice on account of these transactions, prompted him to entertain the idea of deposing him from the electorate, and reponing John Frederic; of which scheme, Maurice being apprised, he, with his usual subtlety and address, patched up a reconciliation with the emperor, and went to take part in the campaign of 1553 against the Turks, who were gradually gaining ground in Hungary. Returning soon, he found that one of his former allies, Albert, markgraf of Kulmbach, had refused to accede to the treaty of Passau, and continued the war on his own account, making raids on the ecclesiastical princes of the Rhine and Franconia. Maurice speedily discovered that the markgraf's apparent obstinacy was the fruit of a secret understanding with the emperor, who was anxious to secure the services of a general and army capable of wreaking his vengeance on the perfidious Saxon prince. So, about midsummer of 1553, Maurice, putting himself at the head of 20,000 men, marched to protect his bishopric of Magdeburg against the ecclesiastical spoliator, and falling in with him at Sievershausen, completely defeated him (July 9), but received in the conflict a bullet wound which proved fatal, July 11, 1553. Thus fell, at the early age of 32, a prince who had already established his reputation as

one of the ablest generals and diplomatists of his time. So thoughtful and reticent, so enterprising and energetic, so correct in judgment and unfailing in action, and at the same time so wholly devoid of moral sentiment, he is one of the most prominent instances of power without principle which the world's history has ever presented. His calculating, plotting mind was concealed under a jovial exterior and a genuine fondness for the favorite pastimes of the age. Yet this unprincipled dissimulator's states were the best governed of the empire; the great vassal was equal with the meanest peasant in the courts of justice; great advances were made in education; and though the least religious man of the time (in fact, honest only in this point, that he did not pretend to a piety which he did not feel), the rights of the various religious sects were strictly maintained. He died at an epoch which was big with the fate of Germany; for his settled programme of action was, after defeating the markgraf, to march upon the Low Countries, unite with the French, with whom he had formed a firm alliance against the emperor, and then attack the latter. Charles V. would have had apparently little chance of offering a successful resistance to such an overwhelming attack. See the biographies by Camerarius, Langenn, and Voigt (1876). His daughter, Anne, became the wife of William of Orange, the liberator of the Netherlands.

MAURICE, Count of Saxony (MARSHAL SAXE). See SAXE, HERMANN MAURICE, *ante*.

MAURICE, Rev. JOHN FREDERICK DENISON, D.D., a distinguished divine of the church of England, and one of the most influential thinkers of his age, was the son of a Unitarian minister, and was born in 1805. His reputation at the university for scholarship stood high, but being at this time a dissenter, and otherwise not in a position to sign the thirty-nine articles, he left Cambridge without taking a degree, and commenced a literary career in London. To this period belongs his novel entitled *Eustace Conway*. He also wrote for the *Athenæum*, which had then been recently started by James Silk Buckingham. After the lapse of two years, a change came over his religious sentiments and opinions; his spirit was profoundly stirred and influenced by the speculations of Coleridge, and he now resolved to become a clergyman of the church of England. He did not, however, return to Cambridge, but proceeded to Oxford, where he took the degree of M.A., and was ordained a priest about 1828. From that time the aim of his whole life was the interpretation of Christianity in accordance with the most pure and spiritual conceptions of our nature; nor have his labors been without result. At the time of his death there was probably no clergyman in the United Kingdom more deeply reverenced and loved than he was by a large body of the thoughtful and cultivated portion of the religious laity. He also succeeded in gathering round him, *within* the church, a large number of adherents, especially among the younger clergy, who constitute what is commonly called the "Broad Church" party, though its members repudiate any sectional tendency, and do not associate for the purpose of carrying out any sectional schemes, like the "Evangelicals" and Tractarians. Maurice's theological opinions, especially on the question of the atonement, are not considered "sound" by the "orthodox" portion of the clergy; and the publication of a volume of *Theological Essays*, in which, among other heresies, he took the charitable view of future punishments, lost him the professorship of theology in King's college, London. For many years Maurice was chaplain of Lincoln's Inn, but in 1860 he was appointed incumbent of the district church of Vere street, Mary-le-bone. He was always a warm and enlightened friend of the working classes, and founded the first working-man's college in London. Maurice became professor of moral philosophy at Cambridge in 1866, and died April 1, 1872. He wrote largely. All his works are written in the most exquisite English, and display a beauty and tenderness of Christian sentiment that are nearly faultless, but united with a subtlety of thought that frequently passes into mysticism. His principal productions are his *Mental and Moral Philosophy; Religions of the World; Prophets and Kings of the Old Testament; Patriarchs and Lawgivers of the Old Testament; The Kingdom of Christ; The Doctrine of Sacrifice; Theological Essays; Lectures on the Ecclesiastical History of the First and Second Centuries; Gospel of St. John;* and *Social Morality*.

MAURICE, THOMAS, 1753-1824; b. Hertford, Eng. After the death of his father he became a pupil of Dr. Parr, in an academy at Stanmore; entered St. John's college, Oxford, in his 19th year, but the next year removed to University college; produced while there a metrical version of *Œdipus Tyrannus* and several original poems, and under his tutor, lord Stowell, he cultivated his taste for historical research. After graduating he was ordained, and appointed curate of Woodford in Essex, resigning in 1785 for a pastorate at Epping. In 1791 his *Indian Antiquities* began to appear, and was completed in 1797 in 7 volumes. His *History of Hindustan*, which he had begun to publish in 1795, was finished in 3 volumes in 1799. In 1798 he was appointed by earl Spencer vicar of Wormleighton in Warwickshire. In 1799 he was appointed assistant librarian in the British museum, and in 1800 received the pension left vacant by the death of the poet Cowper. His *Modern History of India* was published in 1802 and 1804. In 1804 he was presented by the lord chancellor to the vicarage of Cudham in Kent. Among his last works were *Memoirs Comprehending the History of the Progress of Indian Literature;* and *Anecdotes of Literary Characters in Britain* during a period of 30 years.

MAURICIUS, one of the greatest of the Byzantine emperors, was descended of an ancient Roman family, and was b. at Arabissus, in Cappadocia, about 539 A.D., and executed Nov. 27, 602. During the reigns of Justin II. and Tiberius, Mauricius served in the army, and in 578 was appointed by the latter emperor to the command of the army against the Persians, in which office he gained the universal esteem of his soldiers, notwithstanding the severity of his discipline, and surpassed the emperor's hopes by humbling to the earth the most dangerous enemy of the eastern empire. In 582 he obtained the rare honor of a triumph at Constantinople, and in August of the same year succeeded Tiberius on the throne. Immediately after his accession, the Persians invaded the Byzantine territories; an army was sent to repel them, and the war between the empires soon became general; a fierce contest of eight years' duration, which, chiefly owing to the internal convulsions that distracted Persia, resulted in favor of the Byzantines. The king of Persia, Khusru II., driven from his throne, fled to Hierapolis, whence he sent to Mauricius a letter beseeching shelter and aid. The emperor's generous nature was not proof against such an appeal: an army was immediately assembled, to which the loyal Persians flocked from all quarters; and in 591, Khusru was restored to his throne, giving up to Mauricius, in evidence of his gratitude, the fortresses of Dara and Martyropolis, the bulwarks of Mesopotamia. Some time after these events, a war broke out with the Avars; and after two years of bloody conflict, with little gain to either side, the Byzantines suffered a severe defeat, and 12,000 veterans were taken prisoners. Mauricius refused to ransom them, and they were consequently put to death. Mauricius's conduct has been satisfactorily accounted for (see Gibbon's *Decline and Fall*), but it excited a deep and lasting resentment amongst the people and the army; and in 602, when the emperor ordered his troops to take up their winter-quarters on the north (or Avarian) side of the Danube, they broke out into open revolt, elected Phocas for their chief, and marching upon Constantinople, raised him to the throne. Mauricius, with all his family and many of his friends, was put to death. He was a general of rare ability, and little inferior as a ruler.

MAURITA'NIA, or MAURETANIA, the ancient name of the most north-western part of Africa, corresponding in its limits to the present sultanate of Morocco and the western portion of Algiers. It derived its name from its inhabitants, the *Mauri* or *Maurusii*. See MOORS. It reached on the south to the desert, and was separated from Numidia on the east by the river Mulucha or Molochath, now the Muluya.

MAURI'TIA, a genus of palms, having male flowers and female or hermaphrodite flowers on distinct trees, imperfect spathes, and fan-shaped leaves. They are all natives of the hottest parts of America. Some of them, like the buriti (q.v.) palm (*M. vinifera*), have lofty columnar smooth stems; others are slender, and armed with strong conical spines. The MIRITI palm (*M. flexuosa*) grows to the height of 100 feet; it has very large leaves on long stalks. The stem and leaf-stalks are used for various purposes. A beverage is made from the fruit, as from that of the buriti palm and several other species.

MAURI'TIUS, or ISLE OF FRANCE, an island of the Indian Ocean, belonging to Great Britain, lies in lat. 19° 58′ to 20° 33′ s., and long. e. from Greenwich 57° 17′ to 57° 46′. It contains about 708 sq.m.; pop. (1871), including the small dependencies of Seychelles, Rodrigues, etc., and exclusive of the military, 318,584, giving the very high average of 450 to the sq. mile. Of the total population, 210,636 were, in 1870, estimated to be Indian coolies. The surface is of varied formation, a great portion being volcanic; while its coast is fringed by extensive coral reefs, pierced in several places by the estuaries of small streams. Its mountains, although of no great height, are marked by the usual irregularities observed in volcanic formations. Of these, the most celebrated is the Peter Botte, situated in the rear of the town of Port Louis, and forming a remarkable cone, sustaining on its apex a gigantic piece of rock, which has the appearance of being poised upon its summit with the nicest precision. In the island are the remains of several small craters, and the traces of lava are numerous. The principal towns are Port Louis, the capital, and Grande Port, or Mahébourg, the southern port, the latter difficult of access for shipping, and much encumbered with coral reefs. Port Louis comprises a spacious harbor, and is provided with an inner basin, denominated the Fanfaron, wherein vessels can take refuge during the hurricanes, which occasionally occur here with exceeding violence. There is also a slip upon which large vessels can be raised for the purpose of examination and repair.

Mauritius produces annually a large amount of sugar, which it exports to England, France, and Australia. The nature of the soil, however, in many parts prevents a more universal development of the culture of this article of commerce. In some districts, considerable tracts of cane-growing land are encumbered with large bowlders; in many places these have been collected into rough walls, between which the canes are planted, while in others their size precludes their removal. The method employed in the cultivation of the cane is similiar to that adopted in the West Indies; but the bulk of the sugar is ultimately shipped in bags composed of the leaf of the Vacoua palm. The climate of this island is remarkably fine. There are four seasons, as in England; but the temperature in the months of November, December, and January is very high. Throughout the year, the thermometer ranges from 76° to 90° in the shade. In some of the more

elevated districts, however, the climate resembles that of the hills of India, and the thermometer usually stands 7° or 8° lower than in Port Louis. The southern portion of the island, called La Savanne, is exceedingly beautiful, and diversified with mountain and ravine, clothed with luxuriant wood. The mountains themselves are bold and fantastic, and present every possible form of outline. Few communities present so varied an admixture as that of Mauritius. The descendants of the original French inhabitants represent a considerable portion of the influential classes; government officials and merchants, or planters of English birth or extraction, make up the remainder. In Port Louis may be seen representatives of almost every eastern nation. Many Chinese find their way here, and there is now scarcely a hamlet that has not its Chinese storekeeper The Creoles, or native colored population, who derive their color from the African and Malagash slaves, form a very considerable portion of the inhabitants. Emigration of coolies from British India, for the supply of the sugar plantations, still continues. There are two lines of railway, accompanied by telegraph lines. Some much-needed sanitary measures have been carried out. Roads have been made, bridges built, and a light-house has been erected off Grande Port. At St. Louis are spacious docks. Hospitals have been founded, and the establishment of savings-banks has proved beneficial. In March, 1868, the island experienced a most calamitous hurricane; and during three or four years previous to 1870, a fearful epidemic raged. The revenue for 1874 amounted to £720,130, the expenditure to £727,064. In 1873, vessels having an aggregate burden of 517,892 tons entered and cleared the ports. The imports for 1874 (chiefly live-stock, rice, guano, grain, wine, machinery) were valued at £2,584,120; the exports (mainly sugar, with some rum and copper), at £3,020,353.

Mauritius was discovered in the year 1505, by the Portuguese commander, Don Pedro Mascaregnhas, and was subquently visited by the Dutch under Van Neck in 1598, who gave the island its present name in honor of Prince Maurice. The Dutch formed a settlement here in 1644, but subsequently abandoned it. A new and more successful attempt to form a permanent establishment was made by the French in 1721, already in in possession of the adjacent island of Bourbon, who re-named it "Ile-de-France." Mauritius remained in French hands until near the close of the year 1810, when it was taken by the British in an expedition under gen. Abercromby, and has since remained a British possession.

MAUROCORDA'TOS, also MAVROCARDATO, a Fanariote family, distinguished for ability and political influence, and descended from merchants of Chios of the Genoese family of Scarlati.—ALEXANDER M. was professor of medicine and philosophy in Padua, and became dragoman or interpreter to the porte in 1681, in which capacity he did much to promote the interests of his countrymen. In 1699, he displayed great diplomatic talents as plenipotentiary of the porte in the negotiations for peace at Carlovicz.—His son, NICOLAS, was the first Greek who was hospodar of Moldavia and Wallachia.—CONSTANTINE, brother of Nicolas, who became hospodar of Wallachia in 1735, abolished slavery in that country, and introduced the culture of maize.—His grandson, ALEXANDER, Prince M., b. at Constantinople in 1787, took an active part in the Greek contest for independence, prepared the declaration of independence and the plan of a provisional government, was elected president of the executive body; and being appointed commander-in-chief, undertook, in 1822, an expedition to Epirus, which ended in the unsuccessful battle of Peta; but he delivered the Peloponnesus by his bold and resolute defense of Missolonghi (1823). Notwithstanding the opposition of the party of Colocotronis and Dimitrios Ypsilanti, he was able afterward to render important services to his country—as, for instance, by the heroic defense of Navarino and Sphacteria; but became very much involved in political strife. He was a steadfast admirer of English policy and institutions, and a fierce opponent of the pro-Russian government of Capo D'Istrias. After the accession of king Otho, he was at different times a cabinet minister and ambassador at different courts. The leading feature of his policy—viz., his endeavor to promote British influence—made him at times very unpopular among his countrymen. Yet, at the outbreak of the Crimean war, it was found necessary to place him once more at the head of the government—a dignity, however, which he soon resigned; but he continued to interest himself in the cause of education, and as late as 1861 held the office of minister of public instruction. He died August, 1865.

MAURY, a co. in central Tennessee; pop. '80, 39,945—18,169 colored; 580 sq.m.; it is drained by the Duck river and its branches and intersected by a branch line of the Louisville and Nashville railroad. The soil is highly diversified and the natural and manufactured products very large. In 1870 nearly 1,500,000 bushels of Indian corn were raised and large quantities of wheat, tobacco, butter, hay, and cotton. There are tanneries, flour mills, and several factories connected with the manufacture of cloth. Chief town, Columbia.

MAURY, JEAN SIFFREIN, Cardinal 1746–1817; b. at Valréas, Venaissin; son of a shoemaker; educated for the priesthood at Avignon; went to Paris at the age of 20 as *abbé précepteur*, but devoted himself to preaching, and by his panegyrics on St. Louis in 1772 and on St. Augustine in 1775, he took the highest rank as a pulpit orator. Appointed preacher to the court he obtained the abbey of Frénade and the priory of Lihons, and also a seat in the academy. In 1785 he pronounced an eloquent panegyric on St. Vincent de Paul.

In 1789 he was chosen deputy of the clergy to the states-general, where he was prominent in defense of the church and royalty; and with great vigor, skill, and eloquence opposed the revolutionary measures until the flight of Louis XVI. At the dissolution of the constituent assembly he left France in 1791 and at the invitation of Pius VI. took up his residence in Rome where he was received with great honor. In 1794 he was made archbishop of Nicæa *in partibus* nuncio to the diet at Frankfort for the election of emperor Francis II., cardinal and bishop of Montefiascone and Corneto. On the invasion of Italy by the French in 1798 he fled in disguise to Venice, and thence went to St. Petersburgh. Returning in 1799 he was appointed by the count of Provence, afterwards Louis XVIII., his ambassador to the holy see. Becoming reconciled to Napoleon he returned to France in 1806. In 1810 he was appointed archbishop of Paris, and when ordered by the pope Pius VII., who was taken captive by Napoleon, to relinquish the administration of his diocese, he disobeyed and was after the restoration imprisoned for a short time at Rome. After this he retired to private life. He published a valuable treatise, entitled *Essai sur l'eloquence de la Chaire* in 2 volumes.

MAURY, MATTHEW FONTAINE, LL.D., an American naval officer, astronomer, and hydrographer, was b. in Virginia, Jan. 14, 1806. In 1825 he was appointed midshipman in the U. S. navy, and during a voyage round the world in the *Vincennes* frigate, commenced a treatise on navigation, which is adopted as a text-book in the navy. In 1836 he was made lieutenant; but being lamed by an accident, and unfitted for service afloat, he was appointed to the hydrographical office at Washington. Here he carried out a system of observations which enabled him to write his *Physical Geography of the Seas*, and to produce in 1844 his works on the gulf stream, ocean currents, and great circle-sailing. He projected the maritime conference at Brussels (1853); and with the co-operation of the British government, and the assistance of naval officers and the learned, completed his sailing charts, to the great advantage of the commerce of the world. In 1855 he was promoted to the rank of commander, and published *Letters on the Amazon and Atlantic Slopes of South America*. At the outbreak of the civil war in 1861, Maury took a command in the confederate navy, and afterwards came as commissioner to Europe. After the war, he returned to the United States. He died Feb. 1, 1873.

MAUSER GUN, the name of the rifle invented by a gunsmith named Mauser of Kannstadt, Würtemberg, in 1871, and used by the Prussians in the war with France. While embracing the advantages of the Bavarian Werder gun, it is of longer range and more rapidly loaded and discharged than the needle-gun. It is of light weight and very simple in construction. It is now in general use in the army of the German empire.

MAUSOLEUM, a sepulchral monument of large size, containing a chamber in which urns or coffins are deposited. The name is derived from the tomb erected at Halicarnassus to Mausolus, king of Caria, by his disconsolate widow, Artemesia, 353, B.C. It was one of the most magnificent monuments of the kind, and was esteemed one of the seven wonders of the world. It was described by Pliny and other ancient writers, as late as the 12 c., and must have been overthrown, probably by an earthquake, during the following two centuries, for all trace of it had disappeared, except some marble steps, when the knights of St. John of Jerusalem, in 1404, took possession of the site of Halicarnassus, then occupied by a small village called Cleesy. While excavating among the ruins for building materials, the knights discovered a large chamber decorated with marble pilasters, and with richly inlaid panels. The sarcophagus of the founder was also discovered in another great hall.

Excavations have been recently made by Mr. Newton, assisted by the British government, and he has succeeded in bringing to light many of the beautiful sculptures of the mausoleum. Amongst others, the fragments of the statue of king Mausolus (now pieced together in the British museum), and a portion of the quadriga which crowned the monument. Many fragments of lions, dogs, etc., and a beautiful sculpture of a horse, have been found. Portions of friezes, of fine design and workmanship, the subjects of which invariably are Greeks in conflict with Amazons, have also been dug up.

The plan of the basement has been traced) the area being 126 ft. by 100 ft. and from the fragments of columns, Ionic capitals, etc., which have been found, the description of Pliny has been verified. The mausoleum consisted of a basement 65 ft. high, on which stood an Ionic colonnade 23½ ft. high, surmounted by a pyramid, rising in steps to a similar height, and on the apex of which stood a colossal group, about 14 ft. in height, of Mausolus and his wife in the quadriga; these statues are supposed to be the work of the celebrated Scopas. The above dimensions are from Mr. Newton's restoration, but they are disputed by Mr. Fergusson, and others. All agree that the total height of 140 ft. given by Pliny is probably accurate.

MAUVAISES TERRES, or BAD LANDS, the name of several different tracts of desolate, treeless, waste and broken land in Dakota, Nebraska, Colorado, and other territories of the United States, but applicable especially to a section along the White river, an affluent of the Missouri. These sections are of the tertiary formation, and abound in relics of extinct species of rhinoceros, hyæna, and other mammals. Some parts of these lands yield a coarse, scanty pasturage after heavy rains, but for the most part they are utterly barren.

MAUVE, See DYE-STUFFS.

MAVERICK, a co in s.w. Texas, bounded on the s. by Mexico; 1200 sq.m.; pop. '80, 2,967; drained by Elm creek and the branches of the Rio Grande which forms its s.w. boundary. The surface is for the most part level and adapted for cattle-breeding which is carried on to some extent. There is very little agricultural production. Chief town, Eagle Pass.

MAVROC-ORDA'TOS. See MAUROCORDATOS, *ante*.

MAW-SEED, a name by which poppy-seed (*Papaver somniferum*) is sold as food for cage-birds. It is given to them especially when they are molting.

MAX, GABRIEL, a German artist, a resident of Munich. His subjects are idealizations from the poets, spiritual in the highest degree, and in execution simple, noble, and effective. "Gretschen on the mountain side on Walpurgis Night," "The Lion's Bride," "The Christian Martyr"—a young girl left to the tigers in the arena of the Coliseum—are among his great works, which have become widely known through recent engravings and photographs. Max is in the prime of his powers, reserved among strangers, but quite social among intimates. He ranks as one of the most eminent living artists of Germany.

MAXCY, JONATHAN, D.D., 1768–1820; b. Mass.; entered Brown university at the age of 15, and graduated in 1787; was tutor 1787–91, during which time he studied theology, and in 1790 was licensed to preach; installed pastor of the First Baptist church, Providence, 1791, and also was elected a trustee and professor of divinity in Brown university. In 1792, at the age of 24, he became its president. In 1802 he was elected president of Union college, N. Y.; and in 1804 resigning, he accepted the presidency of South Carolina college at Columbia, retaining it until his death. He was an eloquent preacher, and learned in philology and moral philosophy. Some of his sermons, including one on *The Existence of God demonstrated from the Works of Creation*, and his *Literary Remains, with a Memoir*, were published, edited by Romeo Elton, D.D.

MAXENTIUS. See CONSTANTINE I., the Great, *ante*.

MAXFIELD, THOMAS, 1720–85; b. England; converted to the faith of John Wesley by the preaching of the great Methodist divine at Bristol; was his substitute in the Foundry church, London, in prayer and expounding the Scriptures, but was not permitted to preach. Nevertheless, led by his evident popularity he attempted to preach, and succeeded so well that Wesley, who was strongly in favor of the strict discipline of the church, listened to the counsel of his mother to hear him before denouncing him, and then granted him leave to preach. He was the first itinerant lay-preacher in the Methodist denomination. In 1744 he attended the first conference at the Foundry church, having been ordained in Ireland by the bishop of Londonderry, who was friendly to Wesley. He was introduced by Wesley into London society, where he contracted a marriage with a lady in a position far superior to his own. In 1746 he attended the third conference at Bristol, and was persecuted in company with other followers of Wesley, being at one time kidnaped and pressed into the king's service. In 1764 he became estranged from Wesley on account of some disagreement in church matters, and associated himself with Bell, an ex-life-guardsman turned local preacher, who, possessing great personal magnetism and wild enthusiasm, had a powerful influence over him. He joined Bell in advocating doctrines so strongly opposed to the reasonable interpretation of the Scriptures, that a decided breach was made between his followers and Wesley, and he withdrew from the Foundry church and founded a society of 170 members who had seceded with him. He continued with this people for 20 years, and when helpless from a stroke of paralysis, Wesley remembered and visited him, and afterward preached to his people in the chapel which he had occupied.

MAXIMIANUS I. See DIOCLETIAN, *ante*.

MAXIMIANUS II. See GALERIUS, *ante*

MAXIMILIAN I., one of the most distinguished of the German emperors, the son and successor of Frederick III., was b. at Neustadt, near Vienna, March 22, 1459. In his 19th year he married Maria, the only child and heiress of Charles the bold, duke of Burgundy, and was soon involved in war with Louis XI. of France, who attempted to seize some of her possessions. Maximilian, although successful in the field, was compelled, by the intrigues of Louis in the Netherlands, and disaffection stirred up there, to betroth his daughter Margaret, a child of four years old, to the dauphin, afterwards Charles VIII., and to give Artois, Flanders, and the duchy of Burgundy as her dowry. In 1486 he was elected king of the Romans. Insurrections in the Netherlands, encouraged and supported by France, occupied much of his time, and again involved him in war with Louis XI. He afterwards repelled the Hungarians, who had seized great part of the Austrian territories on the Danube; and the Turks, who in 1492 invaded Carinthia, Carniola, and Steiermark. He again took up arms against France, because Charles VIII. sent back his daughter, and married Anne of Bretagne, in order to acquire that great province. A peace was, however, soon concluded at Senlis in 1493, Maximilian receiving back the provinces which he had given with his daughter. On the death of his father in 1493, he became emperor, and he subsequently married Bianca Sforza, daughter of the duke of Milan. He applied himself with wisdom and vigor to the internal

administration of the empire, took measures for the preservation of peace in Germany, and encouraged the cultivation of the arts and sciences. But he was soon again involved in wars against the Swiss, the Venetians, and France. He sought to put a stop to French conquests in Italy, and was at first successful; but after various changes of fortune, and years of war, mingled with many political complications, he was compelled to give up Milan to France, and Verona to the Venetians. Nor was Maximilian more successful against the Swiss, who in 1499 completely separated themselves from the German empire. The hereditary dominions of his house, however, were increased during his reign by several peaceful additions; and the marriage of his son Philip with the Infanta Juana, and of his daughter Margaret with the Infant Juan of Spain, led to the subsequent union of Spain with Austria; whilst the marriage of two of his grandchildren with the son and daughter of Ladislaus, king of Hungary and Bohemia, brought both these kingdoms to the Austrian monarchy. Maximilian died at Wels, in Upper Austria, Jan. 12, 1519. He was of a chivalrous character. He wrote various works on war, gardening, hunting, and architecture, some poems, and an autobiography full of marvels.

MAXIMILIAN II., JOSEPH, King of Bavaria, son of Ludvig I., was b. Nov. 28, 1811. He married in 1842 the princess Maria Hedwig, cousin to the present king of Prussia. Until 1848 he took no part in political affairs, but devoted himself to agricultural and other improvements, and to the pursuits of literature and science. In that year of the revolutionary excitement, he was suddenly called to the throne, on his father's abdication, and adopted a policy accordant with the liberal tendencies of the time. Reactionary measures were afterwards to some extent adopted; but Maximilian's reign was chiefly signalized by the encouragement of science. He was regarded with no favor by the ultramontane party, but without respect to their opposition, he brought to Munich men of liberal opinions, eminent in literature and science. He died Mar., 1864.

MAXIMILIAN, EMPEROR OF MEXICO, otherwise FERDINAND MAXIMILIAN JOSEPH, Archduke of Austria, was b. on July 6, 1832. He was the son of the archduke Francis Charles, and the younger brother of Francis Joseph I. Maximilian, who received a careful education, was very popular as governor of the Lombard-Venetian kingdom. In 1862 the French were induced to interfere in the affairs of Mexico and in 1863 called together an assembly of notables. This body decided in favor of monarchy; and a deputation was appointed to offer the crown of Mexico to Maximilian. After deliberation he solemnly accepted it; and in June, 1864, he entered Mexico. He was of course warmly welcomed by the clergy and the army; but he soon found that they expected him to sanction abuses which he felt bound to condemn; though he gained the support of the liberals. For a time all went well; but he vainly tried to reconcile Mexican parties, who had no other object in view than power and place. A proclamation he was induced to make in Oct., 1865, threatening to punish with death under the laws of war all who offered resistance to the government (asked for merely to suppress brigandage), was so employed both by the imperialist and French commanders, that under it many estimable liberal officers were cruelly shot as robbers. Juarez and his followers again raised the standard of independence. At the same time, Louis Napoleon had to contemplate the withdrawal of his troops. In vain the empress, a daughter of Leopold I. of Belgium, went to Europe to enlist support for her husband; her reason gave way under the continued grief and excitement brought on by disappointment. The French were most anxious that Maximilian should leave with their troops; but he felt bound as a man of honor to remain, and share the fate of his followers. At the head of 10,000 men, he made a brave defense of Queretaro against a liberal army under Escobedo. On the night of May 14, 1867, gen. Lopez betrayed him. The liberal minister of war ordered Maximilian and gens. Miramon and Mejia to be tried by court-martial; and it was in vain the European ministers protested against this breach of the laws of civilized warfare. The trial was of course a mere farce, and the charges chiefly rested on the proclamation above referred to and the executions which followed it. On July 19, the three prisoners were shot. After some delay, the body of Maximilian was given up to his relatives, and was conveyed to Europe in an Austrian frigate. After the death of Maximilian, his writings were published under the title of *Aus Meinem Leben; Reiseskizzen, Aphorismen, Gedichte,* etc. (7 vols. 1867).

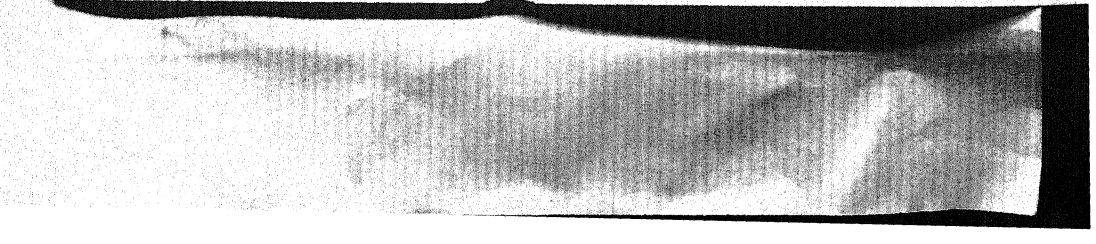
MAXIMIN, CAIUS JULIUS VERUS MAXIMINUS, a Roman emperor; b. in the latter part of the 2nd century. He was originally a Thracian shepherd. Attracting the attention of the emperor Septimius Severus by his immense size and wonderful feats of strength and agility, he was admitted to the army; was rapidly advanced for his bravery, put in command of a new legion raised in Pannonia, and obtained great influence over the soldiers. At the head of this legion he followed Alexander in his campaign against the Germans. When the army was encamped on the banks of the Rhine, he conspired against Alexander, and caused him to be put to death in his tent, with his mother Mammæa, A.D. 235, Being proclaimed emperor, he named his son Maximus Cæsar, and made him colleague in the empire. He continued the war against the Germans, and devastated a large part of the country beyond the Rhine. But his cruelty and rapacity aroused the indignation of the people. For alleged conspiracy against him he put to death Magnus, a senator, with 4,000 other persons, and for the imperial treasury confiscated the municipal property. He also opposed Christianity, and persecuted the bishops who had been

favored by Alexander. The provinces of Africa revolted and proclaimed Gordianus, who was soon after acknowledged by the senate and people. Rome, fearing the vengeance of Maximin, the senate proclaimed emperors Clodius Papienus Maximus and Decimus Cælius Balbinus, and with them was associated by order of the people a nephew of the younger Gordianus. Maximin having crossed the Isonzo, laid siege to Aquileia in Italy, but met with strong resistance from the garrison and people. The soldiers mutinied and killed both him and his son in 238. Maximin was a fierce soldier, and his son a handsome but arrogant youth.

MAXIMS, LEGAL, a term used by members of the legal profession and writers on jurisprudence to denote those brief and pithy utterances, which by general consent have been accepted as embodying in proverbial form the accumulated wisdom of the past, the well-determined general principles which are the foundation of both law and equity. As these general principles are founded on the natural law of justice, safety, and public policy, they are not liable to change by statute or local enactment; and however the legislative power may see fit to apply them in particular instances, the basis of the law is the same in all countries. Hence it follows that the utterances of ancient Roman magistrates and authors of legal treatises remain to this day of as much force and truth as when first promulgated. As the code of Justinian forms the basis of the civil law, still in force over most countries of Europe, and as the works of all the earlier writers of our English common law were couched in the Latin language, it is not surprising that by far the largest number of these maxims are in Latin, which tongue, moreover, is adapted to give such maxims their needful condensation and precision. In very few instances can the maxims be traced to their original sources; many are derived from the Roman law; many are from continental jurists of the middle ages; while a very large number were enunciated by early English judges and writers, and still others are of quite modern origin. The form in which they are expressed is often varied and in many cases an abbreviated form is employed by most lawyers in place of the full utterance. Like other expressions of the common law, the maxims derive their force and authority in the first place through the truth and justice of the principles which they enunciate, and, secondly, through the universality of their acceptance and application by courts in the past. They are not, therefore, of absolutely equal and binding authority, or rather it is impossible to draw a line strictly dividing accepted maxims from mere expressions of opinion. While it has been said that maxims resembled both mathematical axioms and proverbs, it is true that they differ from both materially in their nature, being more the outcome of inductive reasoning than are axioms, and more carefully framed and specifically applicable than proverbs. The number of those universally accepted as law is very large indeed. Works devoted entirely to the consideration of the meaning and application of this form of law have been published by several authors. Perhaps it would be safe to put the number of those maxims which are properly so-called, not mere *dicta*, and which are in common use, as not less than two hundred. If the definition be made broader in both respects, we must add to this many hundreds. Bouvier in his *Law Dictionary* gives a very complete list, which cannot fall far short of two thousand distinct maxims. The reader will most easily understand the nature and style of this class of pithy legal sayings by examining a few which are selected from the great mass, mainly with regard to their brevity and frequent use. Such are: *caveat emptor*—let the buyer be on his guard—a most important principle of the law of contracts, but not to be construed too strictly; *Qui facet per alium, facit per se*—he who acts by another, acts himself—in which may be seen the main principle of the law of agency; *Æquitas sequitur legem*—equity follows the law; *Ex nihilo nihil fit*—from nothing comes nothing; *Fraus est celare fraudem*—to conceal a fraud is itself a fraud; *A l'impossible nul n'est tenu*—no one is bound to do what is impossible, the language being what is called "law French"; *Ubi jus, ibi remedium*—where there is a right there is a remedy; *Ignorantia legis neminem excusat*—ignorance of the law excuses no one; also expressed by *Ignorantia facti excusat, ignorantia legis non excusat*—ignorance of fact, but not of law is an excuse; *Prior tempore, potior jure*—first in time, first in right; *Id certum est, quod certum reddi potest*—that is certain which may be rendered so. Among those commonly given in English may be mentioned: Acts indicate the intention; When the equities are equal the law shall prevail; When the foundations fail, all fails; Once a fraud, always a fraud.

As may be readily perceived, the difficulty in practically employing these and the many similar maxims, is twofold; first, in correctly amplifying and expounding the extended meaning sought to be conveyed in the condensed form; and, secondly, in properly applying it to the adjudication of the particular facts of the case in question; and it is the work more especially of the writer of treatises on the various branches of law and equity to perform the first duty; while to the active practitioners and to the judges emergencies are constantly presented, calling for the exercise of the latter function.

MAXIMUM, in mathematics, the greatest value of a variable quantity or magnitude, in opposition to *minimum*, the least. More strictly, a maximum is such a value as is greater than those immediately preceding and following it in a series; and a minimum is a value which is less than those immediately preceding and following it, so that a function may have many maxima and minima unequal among themselves, as in the case of a



curve alternately approaching and receding from an axis. Traces of the doctrine of maxima and minima are to be found in the works of Apollonius on conic sections. The thorough investigation of them requires the aid of the differential calculus, and even of the calculus of variations. The brothers Bernouilli, Newton, Maclaurin, Euler, and Lagrange, have greatly distinguished themselves in this department of mathematics. The Hindus have displayed great ingenuity in solving, by ordinary algebra, problems of maxima and minima, for which, in Europe, the calculus was considered to be necessary.

MAXWELL, HUGH, 1787–1873; b. Scotland, and brought to the United States in childhood; graduated at Columbia college in 1801, and entered the profession of the law in New York, where he became prominent as a learned and skillful advocate. He was assistant judge-advocate general of the U.S. army in 1814, and district attorney for New York county in 1819, and again in 1822–29. He took a distinguished part in the "conspiracy trials" of 1823, and was collector of the port of New York 1849–53. He was a prominent whig politician.

MAXWELL, JAMES CLERK-, one of the greatest of modern natural philosophers, was the only son of John Clerk-Maxwell of Middlebie, a cadet of the old Scottish family of Clerk of Penicuick. He was b. in 1831 and died in November, 1879. He was educated in boyhood at the Edinburgh academy. His first published scientific paper was read for him by prof. Forbes to the Royal society of Edinburgh before he was fifteen, and when he had received no instruction in mathematics beyond a few books of Euclid, and the merest elements of algebra. He spent three years at the university of Edinburgh, working with physical and chemical apparatus, and devouring all sorts of scientific works in the library. During this period he wrote two valuable papers, *On the Theory of Rolling Curves*, and *On the Equilibrium of Elastic Solids*. Thus he brought to Cambridge, in the autumn of 1850, a mass of knowledge which was really immense for so young a man, but in a state of disorder appalling to his private tutor. But by sheer strength of intellect, though with the very minimum of knowledge how to use it to advantage under the conditions of the examination, he obtained in 1854 the position of second wrangler, and was equal with the senior wrangler in the higher ordeal of the Smith's prize.

In 1856 he became professor of natural philosophy in Marischal college, Aberdeen; in 1860 professor of physics and astronomy in King's college, London. He was successively scholar and fellow of Trinity; and was elected an honorary fellow of Trinity when he finally became, in 1871, professor of experimental physics in the university of Cambridge. There can be no doubt that the post to which he was ultimately called was one for which he was in every way pre-eminently qualified; and the Cavendish laboratory, erected and furnished under his supervision, remains as remarkable a monument to his wide-ranging practical knowledge and theoretical skill as it is to the well-directed munificence of its noble founder. In clearness of mental vision, in power of penetration, and in the possession of that patient determination to which Newton ascribed all his success, Maxwell is to be ranked with Faraday. He was too rapid a thinker to be a good lecturer, except for the very highest class of students. The great work of his life is undoubtedly his treatise on *Electricity and Magnetism* (2 vols. 1873). He had previously, from 1856 onward, published various papers on these subjects, following very closely the experimental procedure of Faraday. His great object was to construct a theory of electricity in which "action at a distance" should have no place; and his success was truly wonderful. There can be little doubt that he has succeeded in laying the basis of a physical theory of electric and magnetic phenomena, quite as securely founded as in the undulatory theory of light: and the luminiferous ether, which is required for the one series of phenomena, is shown to be capable of accounting for the others also. One grand test is found in the fact that, if his hypothesis be correct, the velocity of light ought to be equal to the ratio of the electrokinetic unit to the electrostatic unit. We are not yet sure of either quantity to within two or three per cent; but the most probable values of each agree so well as almost to put the hypothesis beyond doubt. In *Nature*, vol. vii. p. 478, the reader will find an account of the more remarkable discoveries in this extraordinary book, which suffices of itself to put Maxwell in the very front rank of scientific men.

Another subject to which he devoted much attention, and in which his numerous discoveries were acknowledged by the award of the Rumford medal, was the perception of color, the three primary color sensations, and the cause of color-blindness. He was the first to make color-sensation the subject of actual measurement.

He obtained the Adams prize from the university of Cambridge for his splendid discussion of the dynamical conditions of stability of the ring-system of Saturn, in which he showed that the only hypothesis consistent with the continued existence of these rings is that they consist of discrete particles of matter, each independently a satellite.

He was perhaps best known to the public by his investigations on the kinetic theory of gases, with their singular results as to the nature of gaseous friction, the laws of diffusion, the length of the average free path of a particle, and the dimensions of the particles of various gases. His Bradford "Discourse on Molecules" is a classic in science.

Besides a great number of papers on various subjects, mathematical, optical, dynamical, he published an extraordinary text-book of the *Theory of Heat* (which has already gone through several editions) and an exceedingly suggestive little treatise on *Matter and Motion*. In 1879 he edited, with copious and very valuable original notes, *The Electrical*

Researches of the Hon. Henry Cavendish, a work which shows that that remarkable man had (a hundred years ago) made out for himself much of what was till very lately looked upon as one of the chief triumphs of the present century.

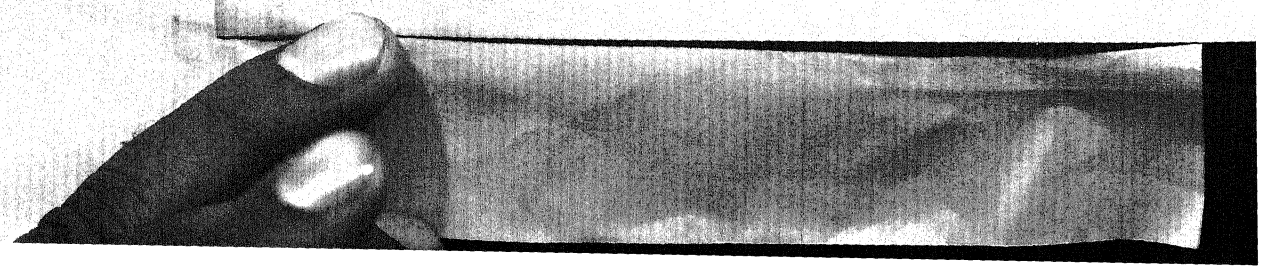
Maxwell obtained the Keith prize of the royal society of Edinburgh for a valuable investigation of stresses and strains in girders and frames; he took a prominent part in the construction of the British association unit of electrical resistance, and in the writing of its admirable reports on the subject; and he discovered that viscous fluids, while yielding to stress, possess double refraction. He was excessively ingenious in illustration, especially by means of diagrams; and possessed a singular power of epigrammatic versification, as the reader of *Nature* and *Blackwood* cannot fail to remember. Some of his last and very best scientific work adorns and enriches the new edition of the *Encyclopædia Britannica*. In these days of materialism it is not superfluous to record that he was, in the full sense of the word, a Christian; and that he asserted that he had examined every form of atheism which he had met, with the result of finding that all ultimately required the recognition of a personal God.

MAXWELL, WILLIAM, 1735–98; b. probably in Ireland; entered the army in America in 1758, and took part in the French war and the war of the revolution; was col. of a New Jersey battalion in the Canadian campaign of 1776; commanded the New Jersey brigade in the battles of Brandywine and Germantown; was engaged in the pursuit of Clinton in New Jersey, and took a prominent part in the battle of Monmouth; was engaged in Sullivan's expedition against the Indians in 1779, and in the battle of Springfield in 1780, shortly after which he resigned. He enjoyed the esteem and confidence of Washington.

MAXWELL, WILLIAM HAMILTON, 1794–1850; b. in Ireland; and when 19 years of age graduated at Trinity college, Dublin. After traveling some years he took orders in the English church, and was in 1820 made rector of Ballagh, county Connaught. As there was not at that time a single Protestant in the parish, Maxwell found leisure to engage in literary pursuits. He wrote in all about 20 volumes, most of which were stories of military life; among them may be mentioned, *O'Hara*, *Stories of Waterloo*, *The Dark Lady of Donna*, *The Bivouac and Rambling Recollections of a Soldier of Fortune*. He wrote also a life of the duke of Wellington, and contributed many papers in the *Dublin University Magazine* and *Bentley's Miscellany*. "Christopher North" spoke of Maxwell in the *Noctes* as a true sportsman, and successful in "many picturesque descriptions of the wildest scenery in Connaught, many amusing and interesting tales and legends, and much good painting of Irish character."

MAXWELL, Sir WILLIAM STIRLING, LL.D., b. near Glasgow, Scotland, in 1818; bore the name of Stirling until 1866, when by the death of sir John Maxwell, his maternal uncle, he succeeded to a baronetcy and assumed the name of Maxwell. He graduated at Cambridge in 1839, after which he visited Spain and France, devoting several years to studies of the history, literature, and art of Spain at the close of the mediæval period. Among his works are *Annals of the Artists of Spain; Cloister Life of Charles V.*, and *Velasquez and his Works*. He was elected to parliament for Perthshire in 1852, and represented that borough most of the time for a period of more than 20 years. He was rector of the university of St. Andrews in 1863, and of that of Edinburgh in 1872, and in 1875 was elected chancellor of the university of Glasgow.

MAY [Lat. *Maius*, contracted from *Magius*, is from a root *mag*, or (Sans.) *mah*, to grow; so that May is just the season of growth], the fifth month of the year in our present calendar, consists of 31 days. The common notion that it was named Maius by the Romans in honor of Maia, the mother of Mercury, is quite erroneous, for the name was in use among them long before they knew anything either of Mercury or his mother. The outbreak into new life and beauty which marks nature at this time instinctively excites feelings of gladness and delight; hence it is not wonderful that the event should have at all times been celebrated. The first emotion is a desire to seize some part of that profusion of flower or blossom which spreads around us, to set it up in decorative fashion, pay it a sort of homage, and to let the pleasure it excites find expression in dance and song. Among the Romans the feeling of the time found vent in their *floralia*, or floral games, which began on the 28th of April, and lasted a few days. The 1st of May—MAY-DAY—was the chief festival both in ancient and more modern times. Among the old Celtic peoples a festival called *beltein* (q.v.) was also held on this day, but it does not seem to have been connected with flowers. In England, as we learn from Chaucer and other writers, it was customary, during the middle ages, for all, both high and low—even the court itself—to go out on the first May morning at an early hour "to fetch the flowers fresh." Hawthorn (q.v.) branches were also gathered; these were brought home about sunrise, with accompaniments of horn and tabor, and all possible signs of joy and merriment. The people then proceeded to decorate the doors and windows of their houses with the spoils. By a natural transition of ideas, they gave the hawthorn bloom the name of the "May;" they called the ceremony the bringing home the May;" they spoke of the expedition to the woods as "going a-Maying." The



fairest maid of the village was crowned with flowers as the "queen of the May;" placed in a little bower or arbor, where she sat in state, receiving the homage and admiration of the youthful revelers, who danced and sang around her. This custom of having a May queen looks like a relic of the old Roman celebration of the day when the goddess Flora was specially worshiped. How thoroughly recognized the custom had become in England may be illustrated by the fact that in the reign of Henry VIII. the heads of the corporation of London went out into the high grounds of Kent to gather the May—the king and his queen, Catharine of Aragon, coming from their palace of Greenwich, and meeting these respected dignitaries on Shooter's hill. But perhaps the most conspicuous feature of these festive proceedings was the erection in every town and village of a fixed pole—called the May-pole—as high as the mast of a vessel of 100 tons, on which, each May morning, they suspended wreaths of flowers, and round which the people danced in rings pretty nearly the whole day. A severe blow was given to these merry customs by the Puritans, who caused May-poles to be uprooted, and a stop put to all their jollities. They were, however, revived after the restoration, and held their ground for a long time; but they have now almost disappeared. In France and Germany too, May-poles were common, and in some places are still to be seen, and festive sports are even yet observed.—See Chambers's *Book of Days*, pp. 569–582, vol. i.

MAY, CAROLINE, b. England, 1820; daughter of the rev. Edward H. May, formerly pastor of the Dutch Reformed church in New York city. She published a volume of original *Poems* in 1864, and *Hymns on the Collects* in 1872. More important than her original work is the anthology which she published in 1848, under the title of *The American Female Poets;* to which are appended her own biographical and critical remarks. The work is written on much the same plan since followed by prof. J. S. Hart, and employed by Griswold in his compilation of a similar nature. Most of the names it contains have grown obscure, but the collection is still of some value to students of American literature.

MAY, SAMUEL JOSEPH, 1797–1871; b. Boston; graduated at Harvard in 1817; studied for the ministry with Henry Colman at Hingham, and with Henry Ware, Andrews Norton, and prof. Frisbie, at Cambridge; was ordained in the Chauncy Place church in Boston in 1822, and shortly afterwards settled as pastor of the Unitarian church in Brooklyn, Conn. When, in 1830, William Lloyd Garrison came to Boston to agitate the slavery question, Mr. May was there, and prominent among those who seconded his efforts. He joined the first society to promote the cause of immediate emancipation, and lived to witness the utter overthrow of slavery. When Prudence Crandall, a Quaker, was persecuted for opening her school for young ladies at Canterbury, Conn., to pupils of African lineage, he became her friend and adviser, and stood up bravely between her and her persecutors; and though he did not save the school from being finally broken up by violence, he did succeed in baffling the attempts to accomplish that result under the forms of law, and in arousing in that part of Connecticut a public sentiment against slavery that has never been overcome, and that for many years has determined the political status of the state itself. The late Arthur Tappan, of New York, furnished him with the funds necessary to prosecute a vigorous campaign for the defense of Prudence Crandall, and to establish a press for the enlightenment of the people. In 1834 Mr. May resigned his pastorate in Brooklyn to accept the position of general agent of the Massachusetts antislavery society. He was a public lecturer against slavery in the years 1835–36, when mobs were epidemic, and his life was often in great peril. His gentleness was as conspicuous as his courage, and he was never once betrayed into any harshness of spirit or language. Oct. 26, 1836, he was settled as pastor of the Unitarian church in South Scituate, Mass., where he remained until 1842, when, at the earnest solicitation of the late Horace Mann, then secretary of the state board of education, he took charge for three years of the normal school at Lexington. In 1845 he removed to Syracuse, N. Y., to become pastor of a Unitarian society, and there remained until his death. In that city he identified himself with the cause of education and with every institution of public charity, and was greatly beloved by the whole people. His house in Syracuse was a constant refuge for fugitive slaves, and he took an active part in the famous rescue of the slave "Jerry" from his legal captors at Syracuse in 1851. For this offense against the fugitive slave law he and 17 others were indicted in the U. S. district court at Auburn. A hundred of the best known citizens of Syracuse accompanied the prisoners to Auburn, and when they were required to give bail for their appearance for trial, William H. Seward was the first to affix his name to the bond, and he also invited the rescuers and their friends to his own house for refreshments. Mr. May and two other gentlemen united in a public declaration that they had "assisted all they could in the rescue of Jerry," that they were ready for trial, and would give the court no trouble as to the fact, but would rest their defense upon "the unconstitutionality and extreme wickedness of the fugitive slave law;" but the district attorney never brought them to trial. Mr. May, during the war, was constantly engaged in labors for the health and comfort of union soldiers, and when the struggle was ended he took an active part in associations for the relief of the freedmen. Many of his sermons and addresses were published, and a volume of his

Recollections of the Antislavery Conflict appeared before his death. His *Memoir* by Thomas J. Mumford was published in 1873.

MAY, THOMAS, an English historian and poet, 1595–1650; b. Sussex, Eng., of an ancient family; educated at Cambridge; repaired to London, became a member of Gray's Inn, and was admitted to the bar. He published the tragedies of *Antigone* and *Agrippina*, a comedy entitled *The Heir*, and other works. Some of his poems were published by special command of Charles I., with whom he was a favorite. Abandoning the court he became a republican. He was secretary to Cromwell during the civil war, and employed to write its history. This was published originally in Latin, and translated into English in 1650. He published two poems on the reigns of Henry II. and Edward III. He translated into English verse *Selected Epigrams of Martial*, Virgil's *Georgics*, and Lucan's *Pharsalia*, to the last of which he wrote a continuation in English and Latin. His *History of the English Parliament*, begun Nov., 1640, was edited by Baron Masères, and translated into French by Guizot. He was buried in Westminster abbey, but soon after the restoration his body was disinterred and thrown into a pit in the adjoining St. Margaret's churchyard. A monument which had been erected over his grave was demolished.

MAY, Sir THOMAS ERSKINE, b. England, 1815; educated at Bedford school, became assistant librarian of the house of commons in 1831, and entered the bar in 1838. In 1844 he published a treatise on the *Law, Privileges, Proceedings, and Usages of Parliament*, which has become a standard authority on parliamentary law. In 1846 he was made examiner of petitions for private bills, and the next year he was appointed taxing-master to the house of commons, of which he became clerk in 1871. In 1849, he published in pamphlet *Remarks and Suggestions with a View to Facilitate the Dispatch of Public Business in Parliament;* in 1850, another pamphlet, *On the Consolidation of the Election Laws*, and in 1861–63, *The Constitutional History of England since the Accession of George III.*, 1760–1860. This work is supplementary to Hallam's, and brings the constitutional history of England down to the present generation. It is a sound and trustworthy book, without special brilliancy. Sir Thomas published, in 1877, *Democracy in Europe—a History;* and he has contributed to the *Edinburgh Review* and the *Law Magazine*.

MÂYÂ is, in the Purânic mythology of the Hindus, the personified will or energy of the supreme being, who, by her, created the universe; and as, in this later doctrine, the world is unreal or illusory, Mâyâ assumes the character of illusion personified. In this sense, Mâyâ also occurs in the *later* Vedânta philosophy, and in some of the sectarian philosophies of India.

MAY'AS, a race of Indians found in the countries of Yucatan, Guatemala, and Tobasco, presenting a subject of interest as to their origin and habits, and their position as regards civilization. They differ decidedly, and in many respects, from other native races of that region. By some they are regarded as of wholly distinct origin; but by most ethnologists it is thought that they are descended from the ancient Toltecs, the builders of the extensive and grand structures whose ruins may be seen at Uxmal, Copan, Itza, and other sites in the neighborhood. The traditions of the Mayas indicate that they have occupied the country for from 600 to 800 years, and it is not improbable that the Toltecs may have merged with tribes immigrating from Cuba or the Antilles. The comparatively high degree of civilization is, doubtless, derived through the Toltec descent. Mayapan, the northern part of Yucatan, was in ancient times their chief home; and in that locality are the ruins of many noble cities. In their early history, though possessed of skill in architecture, with some knowledge of navigation and commerce, and though using an alphabet and written language, the Mayas were semi-barbarous in many respects, such as painting and tattooing the body and compressing the heads of their infants. After the Spanish invasion the Mayas were gained over to Christianity, after the usual fashion of the invaders, by fire and sword. Many of their savage customs were laid aside; but in 1848 occurred a most extensive uprising of the natives in many parts of Mexico, and the race regained its independence. Little communication has been held with them since, but it is said that they are once more lapsing into their old religion, which, like all those of Mexican origin, was founded on the basis of human sacrifice, and was blood-stained and revolting in the extreme. The ancient language and the alphabet of the Mayas have long been a subject of discussion by grammarians and students of comparative philology. The alphabet proper contains 29 characters, two or three forms being used for some of the English letters, while *d*, *f*, *g*, *q*, *r* and *v* are wanting; *s* and *z* are denoted by the same hieroglyphic, as are also *i* and *j*. There are in use, additionally, a set of marks indicating syllabic sounds. The manuscripts in existence are written upon bark, and the lines read from right to left. A number of grammars and dictionaries of the language exist, mostly in Spanish and French. The latest is that of Dr. Behrend (1875).

MAY-APPLE. See PODOPHYLLUM, *ante*.

MAYBOLE, a burgh of regality, in the county of Ayr, Scotland, 9 m. s. of the town of that name, and on the line of the Ayr and Girvan railway. Pop. '71, 3,797, who are

mostly shoemakers and weavers. In feudal times it was considered the capital of Carrick, and was the seat of the courts of justice of the Carrick bailiery. In the vicinity of Maybole are the ruins of the famous abbey of Crossraguel, the head of which, at the time of the reformation, was Quentin Kennedy, who held a public disputation with John Knox in a house at Maybole, which is still shown.

MAY BUG. See COCKCHAFER, *ante*.

MAYENCE. See MAINZ.

MAYENNE (Lat. *Meduana*), a river in the n.w. of France, which rises in the department of Orne, and after being joined on the right by the Varenne, Calmont, Ernée, and Oudon, and on the left by the Jouanne and Ouette, debouches at Pont de Cé, into the Loire, under the name of the Maine, having become navigable 50 m. s. of Mayenne.—This river gives its name to the department of MAYENNE, which has been formed from the western part of the old province of Maine and the n. of Anjou. Area, 1990 sq.m.; pop. '72, 350,637. Mayenne, which is included almost entirely within the basin of the Loire, has a mild climate, but only a partially productive soil, being occupied in many districts by extensive sandy heaths. The chief branches of industry are the breeding of cattle and sheep, and the rearing of bees; while the iron mines and marble quarries of the district yield employment to the poorer classes. The linen, hemp, and paper manufactures are of some importance. Mayenne is divided into the three arrondissements of Laval, Château-Gontier, and Mayenne.

MAYENNE, chief t. of the French department of the same name, is situated on the Loire, on the right bank of which rises, on a steep and rocky height, the ancient fortress of the dukes of Mayenne. Lat. 48° 14′ n., long. 0° 35′ west. The town is pleasantly situated, has several good squares, and some fine fountains; but it is specially remarkable for the extreme steepness of its narrow and winding streets. Manufactures of calico and linen. Pop. '76, 8,826.

MAYER, ALFRED MARSHALL, b. Baltimore, 1836; educated at St. Mary's college. In 1856 he was appointed professor of physics in the university of Maryland; and he has since held a similar position in the Westminster college in Missouri; in Pennsylvania college; in Lehigh university, and in the Stevens institute of technology, Hoboken, N. J., where he remains. He was for a time one of the editors of the *American Journal of Science and Arts*, and has published a number of contributions to science, of which may be noted: *Estimation of the Weights of very Small Portions of Matter*, 1858; *Researches in Electro-Magnetism*, 1873; and *Researches in Acoustics*, 1874. Since his connection with the Stevens institute, he has made a specialty of acoustics, in which he has made many interesting experiments, and some valuable discoveries. He has established the connection between the pitch and duration of a sound, has invented a method of determining the comparative intensity of sounds with the same pitch, and has located the organs of hearing in the mosquito. He has also developed new processes for analyzing sound, and has made researches into the nature of electricity.

MAYER, BRANTZ, 1809–79, b. Baltimore; educated at St. Mary's college, and after graduation, made a tour to the East. He returned to America in 1828, and was called to the bar, but gave up the practice of his profession in 1841, to become secretary of the American legation at Mexico. He came back in 1842 and for a time edited the Baltimore *American*. In 1867 he became a paymaster in the army. In 1844 he published the results of his observations in Mexico, under the name of *Mexico as it was and is*, describing the political and social state of Mexico at that time, with some account of the ancient Mexican civilization. To the latter branch of this subject, he returned in his *Mexico: Aztec, Spanish, and Republican*. This work, which appeared in 2 vols. in 1851, is of considerable value for the study of Mexican history after the Spanish conquest. In 1854 his *Captain Canot* came out, devoted to the exposure of the slave trade, and from its subject became highly popular. The Smithsonian institution published in 1856, his *Observations on Mexican History and Archæology*. He was one of the founders of the Maryland historical society.

MAYER, JOHANN TOBIAS, 1723–62, b. Würtemberg; son of a civil engineer, whose death left him dependent on his own exertions. He taught mathematics for a living, and devoted himself to the study of gunnery. In 1746 he assisted in founding the cosmographical society of Nuremberg, to whose *Transactions* he contributed a number of papers, among them an important paper on *The Libration of the Moon*, in which he made the first use of the equations of condition, which have since been so generally applied. In 1751 he was appointed director of the observatory of Göttingen, where for the remainder of his life, he did much to advance the sciences of astronomy and navigation. His first published work was *A Treatise on Curves for the Construction of Geometrical Problems*, which was followed the same year, 1745, by *A Mathematical Atlas*. At Göttingen, he gave much labor to a *Zodiacal Catalogue*, which contains 998 stars. His *Lunar Tables* were published in 1755, and were so correct as to be be adopted by the British board of admiralty. In the same year he dis-

covered the repeating circle, which was afterward used with so much success by Borda in measuring the arc of the meridian. He left a large number of scientific memoirs.

MAYER, JULIUS ROBERT, Dr., a German physicist, b. in Heilbroun, Würtemberg, 1814. He attended the gymnasium at Heilbroun, studied medicine at Tübingen, and finished his course at Munich and Paris. He made a voyage to Java in 1840, and while there he made observations on the blood which led him to the investigation of the subject of animal heat, and finally to that of the conservation and correlation of forces. After his return to Heilbroun he became town physician, which interrupted his investigations, but he published a preliminary notice of the work he had accomplished up to 1842, in Liebig's *Annalen der Chemie und Pharmacie* under the title *Bemerkungen über die Kräfte der unbelebten Natur*. In 1845, he made a fuller explanation of the subject in a memoir, under the title, *Die organische Bewegung in ihrem Zusammenhange mit dem Stoffwechsel*. In 1848 he published *Beitrage zur Dynamie des Himmels*, and in 1851 the essay for which he is perhaps more generally known in popular science, that upon the mechanical equivalent of heat, in which he developed and expanded the principles laid down in his former papers. His argument is that the sun's power is the source of all energy on the earth, nature storing up the light and heat, and molding it into permanent forms, from which other kinds of energy may be derived. In this way various potential conditions are formed, plants storing up power to be afterward transferred to animals and diffused in motion or work; or the plants in the form of wood and coal may liberate their forces by combustion. He determined the numerical relation between heat and work, and followed up his investigation by considering the vast amount of heat generated by gravity when the force continues its action through sufficient space; concluding that the gravitating force between the sun and the earth possessed a heat equivalent to a mass of 6,000 times the weight of the earth, and that the light and heat of the sun are maintained by the constant impact of meteoric matter. In 1848 Dr. Mayer incurred the displeasure of many of his former friends by taking sides against the revolutionists, and the attacks made upon his scientific investigations so affected him as to throw him into a sleepless condition which resulted in delirium, during which he leaped from a window 30 ft. high, sustaining severe injuries, from which, however, after a long time he recovered. His works have been published under the title *Die Mechanik der Wärme*, (Stuttgart, 1867). The Copley medal was awarded to him by the royal society of London in 1871.

MAYER, KARL, 1799–1862, b. Germany; a voluminous composer for the piano. He went to Russia with his father, who was a member of a regimental band, in 1812. While at Moscow he was a pupil of the pianist John Field. After a residence in Paris and Brussels, and a tour through Germany, he went back to Russia, where he won a high reputation as a teacher of the piano. He gave lessons at St. Petersburg and Moscow, but finally made his home in Dresden, where he died. He left 351 compositions for the piano, of which the more pretentious are concertos for the piano and orchestra.

MAY-FLY. See EPHEMERA.

MAY'HEM. See BEATING AND WOUNDING, *ante*.

MAYHEW, EXPERIENCE, 1673–1758, b. Martha's Vineyard. He was the oldest son of Rev. John Mayhew, and great-grandson of Gov. Thomas Mayhew. He began to preach to the Indians at the age of twenty-one, in 1694, and had the oversight of five or six Indian assemblies, which he continued for 64 years. Though not favored with a learned education, he became so conspicuous that Dr. Cotton Mather in a sermon printed at Boston in 1698, and reprinted in his *Magnalia*, London, speaking of more than "thirty hundred Christian Indians," and "thirty Indian assemblies," adds: "A hopeful and worthy young man, Mr. Experience Mayhew, must now have the justice done him of this character, that in the evangelical service among the Indians there is no man that exceeds this Mr. Mayhew, if there be any that equals him." Having thoroughly mastered the Indian language, which he had learned in infancy, he was employed by the commissioners to make a new version of the Psalms and the gospel of John, which he did in 1709 in collateral columns of English and Indian. He was offered the degree of master of arts at Cambridge, which, though he declined, was conferred upon him at the public commencement, July 3, 1723. He published in 1727 *Indian Converts*, comprising the lives of 30 Indian preachers and 80 other converts, besides a volume entitled *Grace Defended*.

MAYHEW, HENRY, 1812–76, b. London; son of a solicitor in good practice. Was sent to Westminster school, but twice ran away, and made a voyage to Calcutta on a ship-of-war. On his return to London he passed three years in his father's law office as an articled clerk, traveled for a period in Wales, and finally adopted the literary profession and settled in London. His first venture was theatrical. In company with Mr. Gilbert à Beckett he took the Queen's theater, where he produced the clever farce of *The Wandering Minstrel*. About the same time he started a comic paper called *Figaro in London*, which was the precursor of *Punch*, of which Mr. Mayhew was also one of the founders. Between the years 1846–51, in conjunction with his brothers, Horace and Augustus, he brought out a number of fairy tales and farces, and a series of humorous sketches, including *The Greatest Plague of Life; Whom to Marry, and How to Get Mar*

ried; *The Image of his Father;* etc. He also published individually *Young Benjamin Franklin; Boyhood of Martin Luther; The Wonders of Science;* and other books for children. In 1851 he produced his most important work, *London Labor and the London Poor, a Cyclopædia of the Condition and Earnings of those that will Work, those that cannot Work, and those that will not Work.* Of this book Mr. Henry T. Tuckerman wrote as follows: "Mayhew has given us the diagnosis of London street life with an analytical precision quite scientific. . . . . A body of the most curious information is brought together, which reveals a world of facts appalling to the sensibilities, and wonderfully suggestive to the political economist." Mr. Mayhew also commenced the publication in numbers of a similar work entitled *The Great World of London,* which was not completed. The first of these works was begun in the London *Morning Chronicle;* it was published in 3 vols., 1861, and reprinted 1868. The versatility of Mr. Mayhew's talent is shown by the widely differing nature of his various works. The London *Athenæum* said of him: "We have long been in want of a 'young people's author,' and we seem to have the right man in the right place in the person of Mr. Mayhew." Another London journal, referring to one of his biographical stories for boys, said that it was "told with the grace and feeling of Goldsmith, and by one who has that knowledge of science which Goldsmith lacked."

MAYHEW, Ira, b. New York, 1814; received an education and went west in early youth, and settling in Michigan became a successful teacher. He was for some years superintendent of schools for the state of Michigan. In 1849 the legislature of Michigan passed a resolve in favor of the publication of a *Treatise on Popular Education* for the use of parents and teachers, which was written by him, considered satisfactory, and is now the sixth volume of A. S. Barnes & Co.'s school-teachers' library, New York. He has published *Practical System of Book-keeping,* and *Universal Book-keeping.* His work is characterized as an efficient help to the cause of popular education which has received merited recognition.

MAYHEW, Jonathan, 1720–66, b. Martha's Vineyard, Mass.; graduated at Harvard college in 1744; ordained minister of the West church, Boston, in 1747, which place he occupied until his death. He took a decided stand against the introduction of bishops into the colonies by the Gospel propagation society, which led to a controversy with Dr. Apthorp and the bishop of Canterbury. He took sides, too, with the opponents of the arbitrary policy of England toward the colonies, boldly expressing his views even in the pulpit. His published works are a volume of seven sermons: *Christian Sobriety, in Eight Sermons to Young Men; Observations on the Charter and Conduct of the Society for Propagating the Gospel in Foreign Parts.* A memoir of him was published by Alden Bradford.

MAYHEW, Thomas, 1592–1682, b. England; was a merchant in Southampton; emigrated to America in 1631, and settled in Watertown in 1636, obtained in 1641 from the agent of lord Sterling a grant of Martha's Vineyard and the neighboring islands, about 50 m. from Plymouth rock. In 1642 he became both patentee and governor of Martha's Vineyard and other islands. His son having been called to labor in the ministry at Edgartown, governor Mayhew encouraged his work, both by his advice and by inducing the Indian sachems to govern their people according to English laws. They "loved and admired him as the most superior person they had ever seen." They drew up a writing in their own language, signed by men "of the greatest note and power," declaring that as they had freely submitted to the crown of England, so they resolved to assist the English on the islands against their enemies. For 40 years while he lived among them the English and Indians were at peace. While governor he also preached, walking sometimes, even in his old age, 20 m. through the woods. When above fourscore years of age they urged him to accept the pastoral charge of them, which, however, he declined on account of his position as governor. He continued to preach to extreme old age.

MAYHEW, Thomas, 1621–57; the only son of governor Thomas Mayhew; b. England; received a liberal education; removed with his father to Martha's Vineyard in 1642; was called by the settlers on the new plantation to the ministry among them. Soon learned the Indian language, and began to preach among them. In 1651 there were 199 men, women, and children who professed to be worshipers of the true God. Desiring to give a more detailed account of the Indians than he could by letter, and to secure aid in his work, he embarked in 1657 for England with his brother-in-law and an Indian preacher, but nothing was ever again heard of the ship. He was an earnest and successful minister, greatly beloved and esteemed by the Indians.

MAYHEW, Thomas, b. London, 1810; brother of Henry and Horace; entered the profession of literature, and particularly distinguished himself by becoming a pioneer in the production of cheap reading matter for the poorer classes. He published a number of works sold for a penny; including dictionaries and grammars, and founded the penny national library.

MAYMEMÉ, or Maimenah, a city in independent Turkestan, about half way between Balkh and Herat, on a river flowing n. towards the Jihun. It consists of about 1500 mud huts, a frail bazaar built of brick, three mosques of mud, and two *medresse,* or

colleges, of brick. It is considered by the natives to be a powerful stronghold, but its only defenses are a simple wall of earth around the city, 20 ft. high; and a citadel surrounded by a fosse, and situated upon a conspicuous hill of steep ascent. The people of the town, as well as those of the khanat, are bold and fearless riders, and of resolute, warlike character.

MAYNADIER, WILLIAM, 1806–71; b. Md., a graduate of West Point military academy; in 1827 was appointed brevet 2d. lieut. of artillery. He was at one time adjutant of the artillery school of practice at fort Monroe, having been previously assigned to duty there. In 1832 he was one of gen. Winfield Scott's aids in the Black Hawk war in Illinois, and in 1835–38 served in the same capacity with gen. Macomb in the Seminole war, a contest between the Indians and settlers in Florida. In 1838 he was appointed capt. and acting inspector of ordnance, and placed on duty at the U. S. arsenal in Pikesville, Md. In 1842 he was promoted to assistant chief of ordnance, holding the position for several successive years, and was gradually advanced from maj. in 1861, to brevet brig.gen. in 1865. He was remarkable for fine abilities rendered useful by a varied experience, for sound judgment and careful discrimination.

MAYNARD, HORACE, b. Mass, 1814; educated at Amherst college. Removed to Tennessee, and held the position of tutor, and afterwards that of professor of mathematics in the East Tennessee university. In 1844 he was admitted to the bar, and entered upon a law practice which became lucrative and important. He was a member of congress from 1857 to 1863, and during the rebellion suffered from serious losses of property. He was again elected to congress in 1866, and continued to represent the Knoxville, Tenn., district until 1873, and afterwards for two years was representative at large. He was appointed minister to Constantinople in 1875 and continued there until 1880, being appointed postmaster-general in August of the latter year.

MAYNARD, Sir JOHN, 1602–90; b. at Tavistock, England; educated at Exeter college, Oxford. After the regular course of study in the Middle Temple he was called to the bar, having been made a member of parliament in the previous year, 1625. He was subsequently made a sergeant-at-law and king's sergeant, but declined the place on the bench offered him by Charles II. in 1660. In a long political career, extending over 65 years, sir John was a witness of and prominent actor in the most eventful crises of English history. An urgent advocate of increasing the power of the people, he never concurred in the extreme views taken by the radical republicans; an earnest Presbyterian, he stood aloof from the absurd fanaticism of many in his party. He was active in the prosecution of Strafford and Laud, but strongly opposed the arbitrary power assumed by the army, and Cromwell's evident intention of making himself king in fact, if not in name; and for the position he took in this respect was twice imprisoned by order of the protector in the tower of London. At the restoration the honor of knighthood was conferred upon him by Charles II.; and his political course under that monarch was judicious and conservative. In the time of the revolution and the accession of William and Mary, he showed great ability, and notably in the great conference held between the house of lords and the commons in regard to the abdication of James II., a measure which he strenuously advocated. In the same year, 1689, he was made a commissioner of the great seal. Macaulay relates that when, at an interview with William III., the king remarked to Maynard that he must have outlived all the lawyers of his time, sir John both wittily and truthfully replied, "Yes; and if your highness had not come to our assistance, I should have outlived the law, also." Both as a statesman and as a lawyer and expounder of the true principles of the British constitution, Maynard occupied a very high position among the many remarkable men of his age. A number of his political speeches and legal decisions have been collected and published.

MAYNOOTH, a village of the co. Kildare, Ireland, 15 m. n.w. from Dublin by the Midland Great Western railway; pop., including the college, '71, 2,091. It is of some historical interest as the seat of the powerful family of the Geraldines, of whose castle large and very striking ruins still remain; and as the scene of more than one struggle with the English power, especially the "rebellion of Silken Thomas," in the reign of Henry VIII., and in the war of the confederates (1641–50). But its chief modern interest arises from the well-known Roman Catholic college, which supplied for many years material for strife to the zealots of the rival religious parties in Great Britain. This college was established during the ministry of Mr. Pitt, in the year 1795, by an act of the Irish parliament, in order to meet a necessity created by the utter destruction, through the French revolution, of the places of education in France upon which the Irish Catholic clergy, excluded by the penal laws from the opportunity of domestic education, had hitherto been driven to rely. The original endowment, an annual vote of £8,928, was continued, although not without sustained opposition, by the imperial parliament after the act of union. In the year 1846 sir Robert Peel carried a bill for a permanent endowment of £26,000 a year, to which was added a grant of £30,000 for building purposes. The building erected under the original endowment is a plain quadrangle. The new college is a very striking Gothic quadrangle by Pugin, containing professors' and students' apartments, lecture-halls, and a singularly fine library and refectory. Pugin's design included a chapel and common-hall, which, owing to insufficiency of funds, have been postponed. Under the act of 1845 the college was to receive 500 students, all

destined for the priesthood. The patronage of the 500 studentships was divided in the ratio of population among the bishops of the several sees of Ireland; but the candidates thus named were subjected, before matriculation, to examination in a comprehensive entrance course. The full collegiate course was of 8 years, 2 of which were given to classics, 2 to philosophy, and the remaining 4 to the more directly professional studies of divinity, scripture, church history, canon law, and the Hebrew and Irish languages. The divinity students, 250 in number, received a money stipend of £20 annually; and at the close of the ordinary course, 20 scholarships, called from the founder, lord Dunboyne, "Dunboyne scholarships," were assigned by competition to the most distinguished students, and might be held for 3 years. The legislative authority was vested in a board of 17 trustees, and the internal administration in an academical body, consisting of a president and vice-president, together with a numerous body of professors and deans. A visitorial power was vested in a board of 8 visitors, of whom 5 were named by the crown, and 3 elected by the trustees. In 1869, by the Irish church act (32 and 33 Vict. c. 38–41), the Maynooth endowment was withdrawn—a capital sum, 14 times its amount, being granted to the trustees for the discharge of existing interests. The college, however, is still maintained on the same footing. The educational arrangements are unaltered, and although the number of pupils, owing to the suspension of free studentships and exhibitions, has somewhat fallen off, the diminution is regarded as temporary. The visitorial powers created under the act of parliament are now exercised by visitors appointed by the trustees, and all state connection is at an end. The college also possesses some landed and funded property, the result of donations and bequests, the most considerable of which is that of lord Dunboyne, Roman Catholic bishop of Cork, who had for a time conformed to the Protestant faith. A great part of the college buildings was burned in Nov., 1878.

MA'YO, a maritime county of the province of Connaught, Ireland, is bounded on the n. and w. by the Atlantic ocean, e. by Sligo and Roscommon, and s. by Galway. Area, 1,363,882 acres, of which 497,587 are arable; population, which in 1861 was 254,449, had fallen in 1871 to 246,030, of whom 238,319 were Roman Catholics, 6,096 Protestant Episcopalians, and the rest Protestants of other denominations. The coast-line of Mayo is about 250 miles. The surface is very irregular, the interior being a plain bordered by two ranges of mountains. Of these ranges, the highest points are Croagh Patrick, 2,610 ft., and Nephin, 2,646 ft. in height. The soil of the plain is fertile, and for the most part suitable either for tillage or for pasture, although the prevalence of rain and ungenial winds render tillage, especially of wheat and potatoes, precarious and unremunerative. The number of acres under crop in 1878 was 192,021. The rearing of cattle forms in most parts of the county the more ordinary pursuit of the agricultural population. In 1875 the number of cattle was 174,614; sheep, 300,328; and of pigs, 53,661. Ironstone abounds in some districts, but, owing to want of fuel, no attempt is made to work it. An excellent marble is found in the north-western district, and there are several places in which slates are successfully quarried. The chief towns are Castlebar, Westport, Ballina, and Ballinrobe. Almost the only occupations of the population are agriculture and fishing. A valuable salmon-fishery exists in the river Moy; and the small lake of Lough Mask is the habitation of the well-known "gillaroo" trout. The Irish language is still spoken in a large part of Mayo. The number of pupils attending school during 1875 was 50,173—an increase of nearly 10,000 since 1871.

Mayo formed part of the extensive territory granted by Henry II. to William de Burgho; but in the middle of the 14th c. one of the younger branches of the family, seizing on the counties of Galway and Mayo, threw off the English allegiance, adopted the "customs of the Irishry," together with the Celtic name of MacWilliam. In the year 1575 the MacWilliam made his submission at Galway; but having subsequently revolted, the district was finally subdued by sir Richard Bingham in 1586. The antiquities of Mayo are chiefly ecclesiastical. Four round towers are still in existence, and there are at Cong the remains of a splendid abbey, which dates from the 12th century. The celebrated "Cross of Cong," now in the museum of the royal Irish academy, was the archiepiscopal crosier of Tuam, once preserved in the abbey of that name.

MAYO, Amory Dwight. b. in Warwick, Franklin co., Mass., Jan. 31, 1823; educated at Amherst college; studied theology with the rev. Hosea Ballou, formerly president of Tufts college; from 1846 to 1854 was pastor of a Universalist church in Gloucester, Mass.; from 1854 to 1856 preached in Cleveland, O.; from 1856 to 1863 in Albany, N. Y.; and from 1863 to 1872 in the church of the Redeemer (Unitarian), in Cincinnati, O.; and from 1872 to 1880 was pastor of the Unitarian church in Springfield, Mass. During his whole public life he has been an earnest advocate of popular education, and has written much upon the subject. He has opposed with zeal the effort to secularize the public schools, contending for the use in them of the Bible as a means of moral instruction. He has also taken a decided stand in favor of the so-called "Christian amendment" to the constitution of the United States. For several years he was professor of ecclesiastical polity in the Meadville (Penn.) theological school, visiting the institution yearly to deliver the necessary lectures. He is at present the editor of the *Massachusetts Journal of Education*, and engaged besides in general labors throughout

the country to stimulate popular interest in the school-system. His published works are *The Balance; Memoirs of Mrs. S. C. E. Mayo*, his first wife; *Graces and Powers of the Christian Life;* and *Symbols of the Capital*, a volume of sermons on the elements of Christian civilization.

MAYO, RICHARD SOUTHWELL BOURKE, Earl of, 1822–72; b. Dublin, Ireland; educated at Trinity college in that city. He was the sixth earl of Mayo, and, until his succession to the title at his father's death in 1867, was known as lord Naas. After graduation he traveled in Russia, and published an account of the trip in *St. Petersburgh and Moscow* (1845). His career in politics was most successful; he was twice returned to parliament, and was made chief secretary for Ireland in 1852 by lord Derby, and again in 1858, and 1866, when that statesman was in power, was reappointed to the same position; and under Disraeli's administration was in 1868 made viceroy of India. Here he at once introduced extensive reforms in the conduct of the public service. To this matter he gave his most earnest attention, and it was while engaged in an examination of the penal settlement at fort Blair among the Andeman islands that he met his death at the hands of one of the convicts. It is generally believed that the act was prompted only by natural malignity, and was not occasioned by any political cause.

MAYO, WILLIAM STARBUCK; b. at Ogdensburg, N. Y., 1812; educated as a physician, and took his degree at the New York college of physicians and surgeons in 1833. Dr. Mayo is chiefly known as a traveler and writer of fiction. He spent some time in Spain and in Morocco and other parts of North Africa; and the experience and information gained in these travels was employed with effect in his earlier novels. In fiction he has written *Kaloolah* (1849); *The Berber, or Mountaineers of the Atlas* (1850); *Romance Dust from the Historic Placer* (1857); and *Never Again* (1873). Of these, the first was the most popular, and obtained a very large circulation. His books abound in incidents of adventure and perils, and show versatility, but his character portrayal is, with one or two exceptions, inferior to his narrative. His style does not avoid extravagance; and sometimes, as in his last book, is somewhat morbid. His work, however, is interesting, and has not failed of readers.

MAYOR (Fr. *maire*, Lat. *major;* see MAOR), originally a steward, bailiff, or overseer, thence the chief magistrate of a city or corporate town in England or Ireland. The mayor is the head of the local judicature, and the executive officer of the municipality; he is elected by the council from the aldermen or councilors, and holds office for a year only. His duties include those of returning officer in all burghs except those cities and towns which, being counties of themselves, have sheriffs of their own. The first mayor of London was appointed in 1189, the first mayor of Dublin in 1409. The mayors of London, York, and Dublin are called "lord mayor." The lord mayor of London has the title of "right honorable," which, along with the title "lord," was first allowed by Edward III. in 1354; is the representative of royalty in the civil government of the city, the chief commissioner of lieutenancy, the conservator of the river Thames; and on the demise of a sovereign, he becomes, *pro tempore*, a member of the privy council. To sustain the hospitality of the city, he receives an allowance of £8,000 a year, with the use of the Mansion-house, furniture, carriages, etc. He is chosen by the livery (q.v.) on Sept. 29, being commonly the senior alderman, who has been sheriff, but not lord mayor. In former times, it was the ambition of the first merchants and bankers of the city to become lord mayor; but since the district within the metropolitan boundaries has come to be but a small fraction of what is generally known as London, this has ceased to be the case; and it is only in the eye of foreigners that the lord mayor of London is one of the most important public functionaries of the realm. The mayor of Dublin was first styled lord mayor by Charles II. in 1665.

MAYOR, *ante*, the ordinary name for the chief executive officer of an incorporated city. No general definition of his powers can be given. They are defined by the charter of the particular city where he holds office, and, as in the case of New York city, are subject to almost annual changes by the legislature. In some cities the mayor actually has great authority; in others, his powers are divided among executive boards or commissions, or he is made dependent for confirmation of his acts or appointments upon the consent of aldermen, or the common council, or other elective or appointive bodies, so that the mayor's actual powers are often extremely limited.

MAYOR, JOHN EYTON BICKERSTETH; b. Ceylon, 1825; educated at Shrewsbury school, and St. John's college, Cambridge, of which he became fellow in 1849. He was assistant master of Marlborough college from 1849 to 1853, took orders in the church in 1855, and in 1863 became librarian of the university of Cambridge, where, since 1872, he has been professor of Latin. His services to the study of classical literature and philology have been eminent, and the number of his works, and particularly of his editions of classical authors, is large. He published an edition of the satires of Juvenal in 1853, and a new edition of the same work appeared in 1878. He has edited the works of Quintilian, the *Speculum Historiale* of Richard of Circencester, the *Second Philippic* of Cicero, and a portion of Homer's *Odyssey*. He has also published a number of school text-books, and *A Bibliographical Clue to Latin Literature*. He has been an associate editor of the *Journal of Classical and Sacred Philology*, and of the *Journal of Philology*.



MAYOR'GA, MARTIN DE, a Viceroy of Mexico. When he arrived in the country the small-pox was raging with great violence, and in a few days 8,000 persons died. He ordered a general inoculation of the people. He was a man of energy, and much interested in the welfare of the people, but his wise and useful measures were greatly hindered and opposed. He founded an academy of arts in Mexico. During his administration gold and silver to the amount of nearly $75,000,000 were coined. He died from poison on his way to Spain. He was the 47th viceroy of Mexico.

MAYOR OF THE PALACE, originally the title of the royal steward under the Merovingian kings. His proper function was the administration of the royal estates, and the care of the royal household; but by 650 the entire administration of the government had passed into the hands of the mayors of the palace. Grimoald of Austrasia, and Ebroin of Burgundy, exercised an absolute authority in their office as mayors. The most famous of the mayors of the palace, Pepin of Héristal, who held the office 688–714, and his son, Charles Martel, who died in 741, were kings in everything but name; and Charles Martel's son, Pepin the short, took the title of king. Thenceforward the office lost much of its importance.

MAYOTTA, one of the Comoro isles (q.v.), ceded to France in 1843, lies in lat. 12° 34′ to 13° 4′ s., and long. 44° 59′ 15″ to 45° 23′ east. It is of irregular form and measures 21 m. from n. to s., with an average breath of 6 or 7 m.: if, however, the dangerous coral reefs which surround the island be included, the whole occupies a space of 30 m. n. and s., and 24 m. e. and west. The surface of Mayotta is very uneven, and is studded with volcanic-looking peaks, some of which exceed 2,000 ft. in height. The shores of the island are in some places lined with mangrove swamps, which are uncovered at low water and are productive of malaria and fever. The island is in most parts capable of cultivation, and contains several sugar plantations. There are produced annually from 40,000 to 50,000 cwts. of sugar; and the total exports for a year are valued at nearly £50,000. It is principally sugar that is exported; and the supply of food grown on the island is insufficient for the use of the inhabitants. The total imports in a year do not exceed in value £25,000. As a colony Mayotta has certainly not fulfilled the expectations entertained by the French at the time of its occupation, notwithstanding the unusually liberal terms held out to the colonists. The French establishment is on the island of Zaondzi, inside the chain of reefs on the e. side of Mayotta, and consists of a governor, colonial officer, some artificers and seamen, and about 100 soldiers, besides a few native ones. There are several substantial government buildings and store-houses; there is a good roadstead, and the fort has been recently strengthened. Mayotta is the only refuge for French ships in the Indian ocean. It is the principal market for the neighboring islands. Pop. '75, 10,875.

MAYOW or MAYO, JOHN, LL.D., 1645–79; b. Cornwall, England; educated at the university of Oxford, and studied both law and medicine, but his taste was for philosophical and chemical investigation; and, though he acquired some celebrity in his profession, both in his practice at Bath and as a medical writer, he is chiefly remarkable for his discoveries and speculations in certain chemical subjects and especially as regards the nature of the process of combustion and chemical affinities. As regards these subjects, he seems to have been far in advance of the scientific theories of his time, and to some extent to have anticipated the discoveries of Priestly and others of the following century. His pamphlet, *De Sale Nitro et Spiritu Nitro-æereo* (1674), maintains that atmospheric air undergoes change in its composition during the combustion of fuel. A collection of his writing, *Opera Omnia Medica Physica*, was published in 1681. He died when only 34 years of age.

MAYSVILLE, a city of Kentucky, United States of America, on the Ohio river, 63 m. s.e. of Cincinnati. It is finely situated, is the river-port of a rich territory, and one of the largest hemp-marts in America. It has extensive manufactories of cotton, hemp, tobacco, iron, and coal-oil. It contains the county buildings, city hall; market, 3 banks, 12 churches. Pop. '70, 4,705.

MAYWEED, *Maruta colula*, a common road-side plant, growing also in pastures and meadows, belonging to the order *compositæ*. It is a native of Europe, but although widely spread in America, it is not an aggressive weed. The flower has somewhat the appearance of chamomile, and is sometimes called stinking chamomile. It has been classed as *anthemis*, and the two genera are much alike.

MAZAMET, a t. of France, dep. of Tarn, 43 m. e.s.e. of Toulouse, on the Arnette, a feeder of the Tarn. It has extensive woolen manufactures and cloth-fairs. Pop. '72, 10,500.

MAZANDERAN, a province of Persia, bounded on the n. by the Caspian sea. It consists for the most part of a tract of low coast-land, about 200 m. in length by 50 in breadth. Along the shore of the Caspian the land is marshy, but further inland the surface becomes elevated. The climate cannot be called salubrious, although it is more healthy than that of the neighboring province of Ghilan. The soil is fertile; rice, cotton, mulberry, sugar-cane, and a variety of fruits are produced. It exports silk, cotton, and rice to Russia, and imports woolen goods, cutlery, tobacco, etc. Throughout the whole province, parallel with the shores of the Caspian, extends a causeway, constructed by

Shah Abbas the great in the 17th c., and still in good repair. Pop. about 150,000; capital, Sari (q.v.).

MAZARIN, JULES (Ital. *Giulio Mazarini*), cardinal and chief minister of France during the minority of Louis XIV., was born July 14, 1602, at Rome, or, some say, at Piscina in the Abruzzi. The social position and occupation of his father are points in dispute. Mazarin studied law at Rome and at the Spanish universities, where he contrived to unite industry with amorous gayety. Afterwards he entered the pope's military service, perhaps about 1624. Having accompanied a papal legate to the court of France, he became known to Richelieu about 1628, who perceived his great political talents, and engaged him to maintain the French interests in Italy, which he did while still employed by the pope as vice-legate to Avignon (1632) and nuncio to the French court, an office to which he was appointed in 1634. The Spaniards complained of his partiality for France, and the pope was obliged to recall him. The subtle Italian was not thus to be check-mated. In 1639 he openly entered the service of Louis XIII., and was naturalized a Frenchman; and in 1641 received a cardinal's hat, through the influence of Richelieu, who, when dying, recommended Mazarin to the king as the only person capable of carrying on his political system. Mazarin's position was one of great difficulty amidst the intrigues, jealousies, and strifes of the earlier years of Louis XIV.'s minority. The queen-mother, Anne of Austria, was at first particularly hostile to him; but although she was declared sole regent and guardian of the young king, Mazarin kept his place as minister, and soon made himself indispensable to her, partly by his wonderful business qualities, and still more by the exquisite charm of his manner, so that, although with greater smoothness, he ruled with almost as unlimited a sway as Richelieu. The parliament, thinking to regain political power, resisted the registration of edicts of taxation; but Mazarin caused the leaders of the opposition to be arrested, upon which the disturbances of the Fronde (q.v.) began. The court retired to St. Germain; Mazarin was outlawed by the parliament; but by the truce of Ruel he still remained minister The feeling against him, however, became still more inflamed when, at his instigation, the queen-regent caused the princes of Condé and Conti and the duke of Longueville to be arrested in Jan., 1650. Mazarin went in person at the head of the court troops to the insurgent provinces; and after the victory at Réthel showed so much insolence that the nobles and the people of the capital made common cause against him, and he thought it necessary to secure his safety by flight to the Netherlands, whilst the press teemed with violent publications against him, known as *Mazarinades*. After the rebellion of the prince of Condé he ventured to return to France; but Paris making his removal a condition of its submission, he retired again from the court, and it was not till Feb. 3, 1653, that he made a triumphant entry into the capital, where he was received with significant silence. Yet in a short time he was popular, and had acquired his former power. Under him the influence of France amongst the nations was increased, and in the internal government of the country those principles of despotism were established on which Louis XIV. afterwards acted. The administration of justice, however, became very corrupt, and the commerce and finances of the country sunk into deep depression. It is admitted that as a financial administrator he was far inferior to Richelieu. Mazarin died at Vincennes, March 9, 1661. He was very niggardly and very avaricious, and had acquired in various ways, fair and foul, an immense fortune, amounting to 12,000,000 livres, which he offered to the king shortly before he died, afraid, it is thought, that it might be rudely seized from his heirs. Louis declined the restitution, which was perhaps what the wily minister expected. He was privately married to Anne of Austria. See the *Memoirs* of Mazarin's contemporaries, Retz, Mme. Motteville, La Rochefoucault, Turenne, Grammont, etc.; *Siècle de Louis XIV.*, by Voltaire; *Mme. de Longueville*, etc., by Victor Cousin; and A. Renée's *Les Nièces de Mazarin*.

MAZARRE'DO Y SALAZOR, JOSÉ MARIA, Admiral, 1744–1812; b. at Bilbao, Spain; entered the navy in 1760; participated in the campaign against Algiers in 1775, and was the means of saving the remnant of the army from destruction. He negotiated peace with the regency, was made maj.gen. of naval forces, and took part in the naval operations against the British in 1780–83. He was promoted to the rank of lieut.gen. in 1789, and to that of commander-in-chief in 1793, and defended Cadiz against the British in 1797. He served as ambassador to Paris in 1799 and 1804; was a zealous supporter of Joseph Bonaparte, who made him counselor of state and minister of marine, which offices he held to the close of his life. As a scientific seaman his rank was high. He built the naval observatory at Cadiz, and published *Rudimentos de Tactica Naval*.

MAZAR'RON, or ALMAZARRON, a sea-port t. of Spain, in the province of Murcia, 27 m. w.s.w. of Cartagena, on the coast of the Mediterranean. The inhabitants are employed in fishing and mining—silver ores and alum being found in the neighboring hills. Much borilla is made here. From the number of ruins found in the vicinity, this is supposed to have been the site of an important Carthaginian settlement. Pop. about 7,000.

MAZATLAN, a sea-port of Mexico, at the mouth of a river of its own name, which falls into the entrance of the gulf of California, lat. 23° 10′ n., long. 106° 21′ w. It is a well-built and picturesque town. The climate is healthy, but very hot (85° to 105° in the shade during August). Pop. from 12,000 to 15,000—a mixed race of old Aztec Mexicans, Indians, Spaniards, and negroes. The chief exports to California and Europe

are silver dollars, Brazil or Lima wood, and copper; imports, provisions, machinery, British hardware and crockery, and dry goods from France and Germany. In 1864 the town was besieged by the French and imperial troops. The harbor of Mazatlan, though much exposed to winds from the s.w., is the most important on the Mexican coast.

MAZDAK, a Persian religious enthusiast and founder of a sect; b. at Persepolis, A.D. 470. He became a priest at Nishapur. Professing himself a prophet sent to regenerate mankind, he obtained many followers, and declared a community of property. He succeeded in converting the king, Kobâd, and his system of communism made great changes in the social order. But the revolution was temporary. He was put to death with thousands of his followers between 530 and 540.

MAZEPPA, JAN "JOHN", hetman of the Cossacks, was b. about 1645, and was descended of a poor but noble family of Podolia. He became a page in the service of John Casimir, king of Poland. A Polish nobleman, having surprised him in an intrigue with his wife, caused him to be stripped naked, and bound upon his own horse, lying upon his back, and with his head to its tail, and sent the animal off, leaving Mazeppa to his fate. The horse carried him to his own distant residence—not to the Ukraine, as has been often said; but Mazeppa, out of shame, fled to the Ukraine, joined the Cossacks, and by his strength, courage, and activity rose to high distinction amongst them, and in 1687 was elected their hetman. He won the confidence of Peter the great, who loaded him with honors, and made him prince of the Ukraine; but on the curtailment of the freedom of the Cossacks by Russia, Mazeppa conceived the idea of throwing off the sovereignty of the czar, and for this purpose entered into negotiations with Charles XII. of Sweden. These and other treasons were revealed to Peter the great, who did not credit the informants; but afterwards, being convinced of Mazeppa's guilt, caused a number of his accomplices to be put to death. Mazeppa joined Charles XII., and took part in the battle of Pultowa, after which he fled, in 1709, to Bender, and there died in the same year. His story has been made the subject of a poem by Byron, of a novel by Bulgarin, and of two paintings by Horace Vernet.

MAZUFURABAD', a t. of India, in the Punjab, about 200 m. n.n.w. of Lahore, at the confluence of the Jhelum and its great tributary, the Kishengunga, over both which rivers there are ferries. It is of importance chiefly on account of its commanding position at the entrance of the Baramula pass into Cashmere. The emperor Aurungzebe built a fort here, which was subsequently replaced by one of greater strength, erected by the Afghan governor Ata Mahomed.

MAZUR'KA, a lively Polish dance of the grotesque kind, the music of which is sometimes in $\frac{3}{8}$ time, but more commonly in $\frac{3}{4}$. The peculiarity of the rhythm, which has a pleasing effect, is what characterizes the music of the Mazurka. It is danced by four or eight pairs, and is much practiced in the north of Germany, as well as in Poland.

MAZZA'RA, a city of the island of Sicily, 26 m. s. of Trapani, stands in a fine plain on the sea-shore. Pop. 11,000. It is inclosed by walls, and has a cathedral, an episcopal palace, a college, and several convents. It has a considerable trade in cotton, which is extensively grown in the neighborhood.

MAZZARI'NO, a t. of Sicily, in the fertile province of Caltanisetta, and 15 m. s.e. of the town of that name. Pop. 11,600.

MAZZEI, PHILIP, 1730–1816, b. Italy; practiced medicine for a number of years in Syria, and was afterwards engaged in mercantile business in London. In 1773 he came to Virginia with a number of Italian emigrants, familiar with the cultivation of the olive, which he wished to domesticate in this country, but the experiment proved unsuccessful. He became a sympathizer with the American revolutionists, and made the acquaintance of many of them in Virginia, including Jefferson, with whom he continued to correspond after his return to Europe, where he was successively attached to the service of the king of Poland and the Russian czar. He published in 1788 *Historical and Political Researches on the United States.*

MAZZI'NI, GIUSEPPE, one of the most remarkable men of modern Italy, was born in 1808 at Genoa, his father being a physician of note, of good private means. In youth Mazzini was noted for the warmth of his friendships, the fixity of his will, and the exaggerated susceptibility of his humane feelings. From birth sentiments of social equality were engendered in him by the example of his parents; and very early the degraded political condition of his country began to prey upon his mind, producing ardent aspirations for her national unity and deliverance from foreign domination, which seemed to him attainable only through a return to the republican glories of ancient times. Mazzini's patriotic enthusiasm speedily gained absolute sway over his spirit, and led him to renounce his cherished idea of a life of literature and contemplative study for the action and strife of the political arena. In 1827 his maiden essay in literature, "Dell' Amor Patrio di Dante," appeared in the liberal journal, the *Subalpino;* and he subsequently contributed critical, literary, and political papers to the *Antologia* of Florence and the *Indicatore Genovese.* In the pages of this latter originally appeared the essay subsequently republished under the title of *Scritti d'un Italiano Vivente.* Literature, according to Mazzini's own assertion, having been employed by the liberal party

solely as a *means* for the great *end* of liberal propagandism, the journals were suppressed, and the writers disbanded. In 1830, the affiliation of Mazzini to the secret society of the carbonari was the introductory step to his practical political career; and the young member was speedily invested with a preponderating influence in the counsels and missions of the body. Insnared and betrayed by a Piedmontese spy Mazzini was arrested, detained for 6 months in the fortress of Savona, and finally liberated on condition of his departure from Italy. After short residences in several places, he took up his abode in Marseilles, and thence he addressed to Charles Albert his famous letter, which drew down on the daring young writer a decree of perpetual banishment. The organization of a new liberal league, "Young Italy," was Mazzini's next work. Republican and unionist to the core, the tendencies of this great body were more humanitarian and universal than its extinct predecessor, carbonarism. In addition to the paramount aim of Italy's republican union under one common law, and the extinction of foreign rule, the general principles of this new association enforced the universal obligation to labor for a common moral regeneration, and the establishment of political equality over the world. Liberty, equality, and *humanity* were the watchwords of the body; "God and the people" their motto; white, red, and green their tricolored banner; education and insurrection the great agencies of their operations; assassination was erased from their statutes, and the symbolic dagger of the carbonari was replaced by the more humane emblems of a book and the cypress. Mazzini was the animating spirit of this formidable league, which speedily inclosed all Europe in a network of similar associations, modified to meet the individual requirements of the various European nationalities. Banishment from Marseilles in consequence of the extensive operations of the society having been revealed to the authorities compelled Mazzini to resort to concealment for a period of several months. About this time a charge was brought against him of advocating assassination as a legitimate weapon in the warfare of liberalism; but the charge was proved in the public tribunals of France to be false; and in the British parliament (1845) sir James Graham made an apology to Mazzini for having re-echoed the calumny. The first-fruits of La Giovine Italia was the revolutionary expedition of Savoy, organized by Mazzini at Geneva, but which was defeated by the royal troops. Sentence of death, *par contumace*, was recorded against Mazzini in the Sardinian courts for his participation in the affair; but he soon recommenced with increased vigor his revolutionary operations. A new association entitled, "New Europe," and based on principles of European rights and enfranchisement, was inaugurated by the exertions of Mazzini in Switzerland. In 1837 Mazzini quitted Switzerland for England, and finally took up his abode in London. From thence his labors in the Italian revolutionary cause have been incessant. To trace the part enacted by Mazzini in the great crisis of 1848 would be to record the history of that period, so intimately were his individual acts connected with the course of events. The resolute combatant of partial union and monarchical leadership at Milan, Mazzini retired to Switzerland on the capitulation of Milan to the Austrians, to reappear in Florence on the rising of Tuscany, and finally at Rome, where he was elected triumvir amidst the triumphant rejoicings of the capital of Italy. His tenure of supreme authority was marked by such wisdom, moderation, and success, as to elicit a public tribute of approbation from lord Palmerston. On the surrender of Rome by Mazzini's advice, he quitted the city, and proceeded to Lausanne *vid* Marseilles. The conduct of France he bitterly attacked in public letters to De Tocqueville and others. He subsequently returned to London, and at his instigation risings in Milan (1853) and in Piedmont (1857) were attempted. In 1859 while lending the whole weight of his influence to the revolutionary movements going on in Italy, he combated with vigilant foresight the threatened French predominance, and refused to accord faith to the liberal programme of Louis Napoleon. The Sicilian expedition of 1860 owed as much to the organization of Mazzini as to the heroic command of Garibaldi (q.v.). In 1864 he was expelled from Switzerland, and returned again to England. Next year he was elected by Messina deputy to the Italian parliament; but the election, to which he himself as a republican would have declined to accede, was canceled by the parliament. Mazzini is said to have founded in 1865 the "Universal Republican Alliance." In 1868 he fell into a dangerous illness, from the effects of which his health never recovered, though his zeal remained as ardent as ever. After an ineffective scheme for a republican rising, Mazzini ventured to enter Italy, and was arrested at Gaeta, where he remained a prisoner till Rome was taken by the Italian army. He condemned the Parisian commune of March, 1871. On his death at Pisa, Mar. 11, 1872, the Italian government honored him with a public funeral.

Mazzini's writings are various and extensive, and include dissertations on art, literature, and music. A complete edition (*Scritti, Editi e Inediti*) was published in 1861 and following years. Whatever may be thought of Mazzini's political views, few will refuse to admire the ardent sincerity of his patriotism, or the inflexibility with which he has pursued his aim, unchecked by persecution, calumny, and defeat. Mazzini possessed in the highest degree that personal fascination by which friends are converted into ardent partisans. In his private life he is allowed to have been a model of purity and frugal simplicity, as in his public career he was conspicuous for disinterestedness and self-abnegation; and to these personal virtues of Mazzini, aided by his extraordinary influence and eloquence, those who know Italy best ascribe a great share at least in inspiring that higher tone of life manifest in recent years among the Italian youth, without which the

political regeneration of the country would have been impossible. See *Memoir*, by E. H. V. (London, 1874).

MAZZUCHELLI, Giovanni Maria, Conte, 1707–65; b. Italy; studied jurisprudence, but gave much attention to scientific researches. In 1737 he published his *Notizie Storiche e critiche intorno alla vita e agli scritti d'Archimede*, describing the various inventions attributed to Archimedes, and questioning the story of the mirrors by which Archimedes was believed to have burned the ships of Marcellus at Syracuse. The favor with which this work was received induced Mazzuchelli to undertake the task of compiling a great cyclopædia of Italian literature and science from the beginnings of Italian civilization. The first two volumes of this work, completing the letter A., appeared at Brescia, in 1753. He lived to publish four additional volumes which carry the work through B. He also wrote *Dissertazioni Storiche, scientifiche ed erudite*, containing an account of the meetings of a literary society which was accustomed to assemble at his house. He wrote biographies of Scipio Capece, and Giusto de' Conti; and he edited Villani's series of biographies of illustrious Florentines. He left a large collection of ancient manuscripts, medals, and casts, which were engraved and published with a descriptive text by the abbé Pietro Gaetano, at Milan.

MAZZUOLA, Francesco. See Parmigiano, *ante*.

MEAD, a fermented liquor made from honey. The honey is mixed with water, and fermentation is induced and conducted in the usual manner. Cottagers sometimes use the honey which remains in the combs after the usual processes of dropping and squeezing, for making mead, which is a thin and very brisk, but at the same time luscious beverage. Mead has been in use from very ancient times, and was known equally to the polished nations of southern Europe and the barbarous tribes of more northern regions. Pliny says it has all the bad qualities of wine, but not the good ones. The Latin name is *hydromeli*.

MEAD, Charles Marsh, D.D., b. Vermont, 1836; graduated at Middlebury college, Vt. in 1856, and at Andover theological seminary in 1862. In 1863 he went abroad and studied at German universities until 1866. Returning to Andover he accepted the professorship of Hebrew. He has given two lectures in Boston on *Christianity and Skepticism*. He was one of the American editors of Lange's commentary on the Bible, and is a member of the Old Testament company of the American committee now (1881) engaged in the revision of the English version.

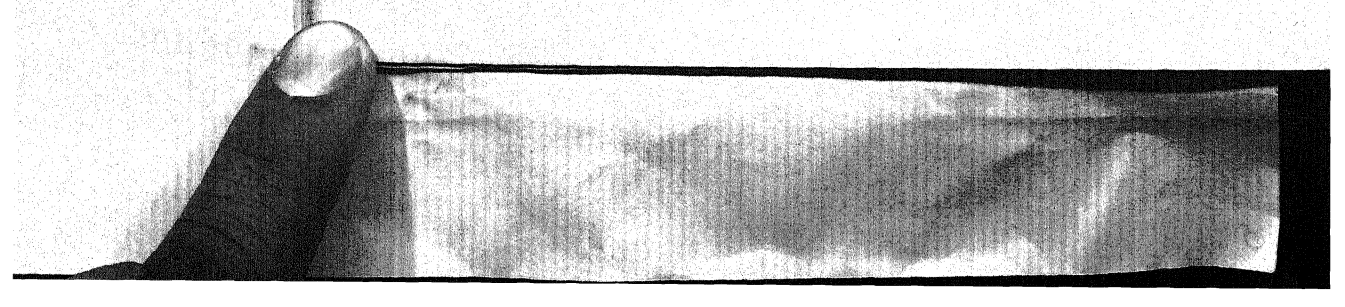
MEAD, Larkin Goldsmith, b. Chesterfield, N. H., 1835; in the earlier part of his life resided at Brattleboro, Vt. In the year 1852 he began the systematic study of sculpture under Henry K. Brown, of Brooklyn. For this branch of art he had already shown a decided aptitude, and had attracted the attention of many artists by his first attempt in design, the execution *in snow* of the figure of an angel. His earliest work in marble was a reproduction of this and was called "The Recording Angel." In 1857 he modeled the colossal statue "Vermont," which now crowns the dome of the state-house at Montpelier, the capital. "Ethan Allen," a finely executed figure of Vermont's hero, adorns the same building, and is one of the artist's later works. Mr. Mead spent some time in Italy and particularly in Florence, whence on his return he brought a number of statuettes, such as "Echo," "La Contadinella," and the "Mountain Boy." He is an excellent draughtsman, as well as sculptor. The Lincoln monument at Springfield, Ill., was erected from his designs. Among his later works are also the soldiers' monument at St. Johnsbury, Vt., and "Columbus's Last Appeal to Queen Isabella." His sister is the wife of William D. Howells, editor of the *Atlantic Magazine*.

MEAD, Richard, 1675–1754; b. at Stepney, England, not far from London. At an early age he entered the university at Utrecht, and, after three years' study, went to Leyden, where he entered upon the study of medicine under the noted professors Pitcairn and Herrmann. After taking his degree of doctor of philosophy and physics he returned to Stepney and began the practice of his profession in 1696. In this he soon won the very first place. In 1703 Dr. Mead was made a member of the Royal society, and lecturer at St. Thomas's hospital. Oxford bestowed a diploma upon him, and after long acting as physician to the prince of Wales, was continued in the office on his accession to the throne, as George II. His reputation both as a practitioner and as a writer on medical subjects was very great, and he was in constant correspondence with the most eminent scientists of the day in his own and foreign countries. Most of his publications were written in Latin. Among them were: *De Imperio Solis et Lunæ in Corpora Humana et Morbis inde oriundis*, (1702), *On Small Pox and Measles*, (1748) *Monita et Præcepta Medica*, (1751), and many others. His works were translated into English and passed through many editions. In addition to his acquirements as a physician, Dr. Mead devoted much time to the study of natural history, antiquarianism and numismatics. Memoirs of his life were published by Dr. Matthew Maty in 1755, the year after his death.

MEADE, a s.w. co. in Kansas; 720 sq.m.; watered by the Cimmaron river and its branches, and well adapted to grazing.

MEADE, a co. in Kentucky, on the Ohio river, which separates it from Indiana; 500 sq.m.; pop. 9,485; the surface is rolling, the soil fertile; live-stock, tobacco, corn, oats, and wool are the principal products. Capital, Brandenburg.

MEADE, GEORGE GORDON, 1815–72; b. Cadiz, Spain; his parents being temporarily in that country. On their return to America, he was sent to the boys' school in Washington, D. C., at that time under the direction of Salmon P. Chase, afterwards chief justice of the supreme court of the United States. On leaving this school, he was sent to a military school at Mount Airy; and from there, in Sept., 1831, entered the military academy at West Point, where he graduated in the summer of 1835. He entered the army as brevet second lieut. of the third artillery, and at the end of the same year, 1835, received his commission as second lieut.; but on Oct. 26, 1836, he resigned from the army, after having, however, seen some active service in the Florida war, even within his brief military experience. He now adopted the profession of a civil engineer; and between 1837 and 1842, was employed as an assistant engineer in the surveys made by the U. S. government of the delta of the Mississippi, the Texas boundary, and the northeastern boundary of the United States. On May 19, 1842, he was reappointed to the army, with the rank of second lieut. of topographical engineers. On the breaking out of the war with Mexico, in May, 1846, when gen. Taylor crossed the Rio Grande, he was ordered to the front, and served throughout the war, being a member of the staff of gen. Taylor, and that of gen. Scott, and distinguishing himself in the battles of Palo Alto, Resaca de la Palma, and Monterey. He was brevetted first lieut., for gallant conduct at Monterey, in the five days' fight which closed Sept. 24, 1846. On his return to the states, the citizens of Philadelphia presented him with a sword. After peace was declared, lieut. Meade was employed in superintending river and harbor improvements, and in the construction of lighthouses on Delaware bay, and off the coast of Florida. He was promoted to be first lieut. in 1851, and capt. in 1856, and had charge of the national survey of the northern lakes until 1861, being at Detroit, Mich., at the period of the outbreak of the rebellion. He was ordered to Washington, and received his commission as brig.gen. of volunteers, bearing date Aug. 31, 1861, with the command of the second brigade of the Pennsylvania reserve corps. He was in the action at Dranesville, Va., Dec. 20, the first victory of the army of the Potomac; was at Mechanicsville, June 26, 1862; at the battle of Cold Harbor, on the following day; and served with his reserves, with which he had become identified, continuing with McClellan throughout the peninsular campaign, in McCall's division, being severely wounded at the battle of Frazier's farm (White Oak Swamp), June 30. He was appointed maj. of topographical engineers, June 18, 1862. On Aug. 29–30 he was engaged in the second battle of Bull Run; and in September took command of a division of the first army corps (gen. Reynolds'), and at the battle of Antietam was slightly wounded and had two horses shot under him. He was given command of the fifth army corps, and on Nov. 29, 1862, was commissioned maj.gen. of volunteers. He was engaged in the battles of Chancellorsville and Fredericksburg; covering the retreat at Chancellorsville with his corps, and guarding the crossings, until the entire army was safely over the river. On June 28, 1863, he was unexpectedly ordered to relieve gen. Hooker of the command of the army of the Potomac. This was the period of Lee's invasion of Pennsylvania, and the union army was in hot march to interfere with his plans, and, if possible, drive his sanguine forces south again. Portions of Lee's army had reached York, Carlisle, and the Susquehanna; but upon the advance of the federal army, these were called together from their various posts, and by order of gen. Lee, drawn in, and concentrated for a great field struggle. Those which were at Chambersburg crossed the South mountain towards Gettysburg, and those that were nearer the Susquehanna converged upon the same point. This was done by Lee, apparently under the impression that Meade designed to cut off his communications. And had it not been for Meade's maneuvering, Lee would have crossed the Susquehanna and struck Harrisburg, and probably even have made a dash at Philadelphia. Gen. Meade now saw that a great battle was inevitable, and at first concluded to receive it at the line of Pipe-clay creek, a small stream running a few miles s.e. of Gettysburg. But on consultation with gen. Hancock, who had been appointed to gen. Reynolds's command (that distinguished officer having been shot), and on the selection of Gettysburg by the latter, as a better ground on which to fight the battle, he made that his choice. [Swinton's *Army of the Potomac.*] The great battle was fought July 1–3, 1863. See GETTYSBURG. Gen. Meade's commission as brig.gen. in the U. S. army, bore the last of these dates. For the inestimable service which he had accomplished by the victory of Gettysburg, he was publicly thanked by a resolution of congress passed Jan. 28, 1866: "for the skill and heroic valor with which at Gettysburg he repulsed, defeated, and drove back, broken and dispirited, beyond the Rappahannock, the veteran army of the rebellion." From May 4, 1864, to April 9, 1865, gen. Meade commanded the army of the Potomac, under gen. Grant, through the disastrous struggle in the Wilderness, and until the capture of Petersburg, and the surrender of Lee. On Aug. 18, 1864, he was commissioned a maj.gen. in the U. S. army. At the close of the war he was placed in command of the military division of the Atlantic, which command he retained from July 1, 1865, to Aug. 6, 1866. During the years 1866–67 he was in command of the department of the e.; and subsequently of the third military



district of the s. (under the reconstruction laws), including Alabama, Georgia, and Florida, with his headquarters in Philadelphia. He was highly honored by his fellow-citizens for his high character, his great military ability, and the important share he had borne in the war of the rebellion. Philadelphians presented him with the house in which he died (Nov. 6, 1872); and after his death a fund of $100,000 was collected by subscription, and presented to his family.

MEADE, RICHARD KIDDER, 1750–1805; b. Virginia, was educated in London at the famous grammar school of Harrow, and, returning to his native state, at the age of 25 he commanded a company in the battle of Great Bridge, near Norfolk, Dec., 1775, the first engagement of the revolutionary war fought on Virginia soil. In 1777 he was promoted to the rank of col., and to the position of aid to gen. Washington, serving in that capacity until 1783. He was a prompt and faithful subordinate, always at hand, and rendered signal service to his country. He was present in an official capacity at the execution of maj. Andre. After the war he lived in retirement on his estate in Clarke county.

MEADE, RICHARD WORSAM, 1778–1828; b. Chester co., Penn.; son of George of Philadelphia, who was noted among his contemporaries for his ardent support of the revolution, in aid of which he contributed very large sums. The subject of this sketch very early in life engaged in the shipping business at Cadiz, Spain, where he sympathized with and assisted the Spanish patriot party, and during the peninsular war imported great quantities of provisions into Cadiz, then in a state of siege. From 1805 to 1816 he occupied the post of commercial agent for the United States, and in the last named year was arrested and imprisoned for two years in the castle of Santa Catalina on charges of conspiracy against the government. On the peremptory demand of the U. S. diplomatic agents, he was released; but his business had been completely ruined by his unjustifiable treatment, and a long legal contest for compensation ensued, in which Webster and others of our most eminent lawyers were engaged for him, but unsuccessfully. In this country Mr. Meade engaged in a large importing trade, made a large fortune, and his private art gallery was one of the first collected here by a private individual.

MEADE, WILLIAM, D.D., 1789–1862; b. in what is now Clarke co., Va.; educated at Princeton college, and after graduation in 1808 studied theology. For many years, as a clergyman of the Protestant Episcopal church, he gave his services without any charge; in 1829 he was appointed assistant bishop, and in 1841 bishop of the diocese of Virginia. It is worthy of note that, at the outbreak of the rebellion, he was earnestly opposed to the secession of his state. His principal literary productions are: *Lectures on the Pastoral Office; Letters to Students; Lectures on Family Prayers*, and *Old Churches, Ministers and Families in Virginia;* besides many papers published in church periodicals. An account of his life has been written by Dr. John Johns, who, in 1842, was appointed his assistant in the Virginia bishopric.

MEADOW GRASS, *Poa*, a genus of grasses, having a loose spreading panicle, the spikelets usually containing a number of florets, and with two glumes shorter than the florets, the florets each having two paleæ, which are bluntish and awnless, the fruit free. The species are very numerous, chiefly natives of the temperate and colder parts of the world, and forming in these a very important part of the herbage of pastures and meadows. Most of the species are of a slender and delicate appearance, with small spikelets and florets; and the herbage is tender, nutritious, and rather abundant. Of the British species, the ROUGH-STALKED MEADOW GRASS (*P. trivialis*) and the SMOOTH-STALKED MEADOW GRASS (*P. pratensis*) are among the most common, and are esteemed among the most valuable for sowing in mixtures of grasses for pasture.—The ABYSSINIAN MEADOW GRASS (*P. Abyssinica*), an annual species, yields immense returns of herbage in its native country, but a warmer climate than that of Britain seems to be requisite for its successful cultivation. It is called *Teff* in Abyssinia, and its seeds are used as corn for making bread. Beer is made by putting slices of this bread into warm water, the temperature of which is kept up in a close vessel for some days.—*P. annua* is an extremely common British species, springing up continually as a weed in cultivated grounds, and abounding on waysides as well as in pastures. It is often to be seen in flower, even in winter, and in summer is said to ripen its seeds in four or five weeks from the time of sowing. It is employed with advantage for sowing on greens in towns, and wherever from any cause perennial grasses are apt to be destroyed. It is very abundant in most parts of Europe, and Dr. Hooper found it at one of the most elevated passes of the Himalaya mountains. —Manna grass (q.v.) is closely allied to this genus.

MEADOW LARK, an American bird belonging to the order *Insessores*, sub-order *conirostres*, family *sturnidæ* or starlings, genus *sturnella*, common species, *sturnella magna*. It is a common bird of the eastern and middle United States, extending s. as far as Texas, inhabiting southern parts in winter, and going as far n. as the St. Lawrence river in the summer to breed. They are therefore birds of passage, returning to the south in flocks in the autumn, but while breeding, are not gregarious. They are beautiful singers, their songs being of the most joyous character and performed when flying high in the air, as well as when skimming over the meadows. Like most of the lark family they build their nests on the ground, among the green tall grass of the meadows. They live

upon insects and seeds, and are said to sometimes kill smaller birds. Their eggs, from four to five, are white with beautiful reddish brown spots, and are laid in oven-shaped nests. Body robust; legs and claws strong; tail yellow beneath, yellowish with brown bars above, with pointed feathers; whole length of body and tail 9 or 10 in.; back, dark brown, each feather having a brownish white margin and a brown terminal spot; breast and under side yellow, with a beautiful, black, pectoral crescent, convexity downwards; bill about an inch long, and characteristic of the family, although rather more slender than the average. See LARK, *ante*.

MEADOW MOUSE, an animal belonging to the order of rodents, family *muridæ* (rat family), genus *arvicola* (voles). There are many kinds of mice. See MOUSE, *ante*. The meadow mouse here designated, the *arvicola riparia*, is American. It is about 4½ in. in length with a tail about 1½; feet large and scaly; hair short; eyes small; no thumb on fore foot; color of back darkish brown, varying in depth, ashy on belly. Several species are described in the 8th vol. of the Pacific railroad survey. The European species are called campagnoles and voles; some of them are aquatic, digging in the marshes and banks of streams.

MEADOWS, a term somewhat indefinitely applied to moist level lands covered with grass, which is usually rich in consequence of the moisture, and often also from advantages of soil. The grass is either used for pasture, or is mown and carried away. *Water meadows* are meadows in which the supply of water is increased and regulated by artificial irrigation. See IRRIGATION. The herbage of all meadows consists generally of various kinds of grasses; meadow-grass, rye-grass, timothy, fox-tail, and bent-grass or fiorin, predominating.

MEADOWS (*ante*). The propriety of confining the word meadow either to moist or to level lands covered with grass is doubtful, for though moisture is essential to the growth of grass as to all other crops, and level ground is preferable to rugged, no greater moisture or more level surface is required for good meadow land than for good corn land. Marsh hay is made from marsh meadows, both fresh and salt; while timothy and red clover, grown for hay, flourish best in rich soils not particularly moist, and derive the same advantage from deep-till drainage as other field crops. Grasses of the red-top family grow best in soils a little more moist than required for the best growth of timothy. Meadows are more comprehensively defined to be lands growing grasses suitable for hay, whether upland or low land, seeded by hand as on farms, or growing wild on marsh alluviums, or western plains, or mountain valleys. The vast prairies in the basin of the Mississippi were probably the greatest extent of natural meadows in the world. Where these grasses were fed down by cattle they ceased to be meadows and became pasture. The use of mowing-machines has quite revolutionized the labor of cutting hay within the past thirty years, and by their use long reaches of narrow valleys among the drier plains, and still narrower bottoms of defiles in the Rocky mountains, are made to yield hay for the needs of regions where hand labor could not be obtained to do the work. The second mowing of meadows in one season is called the aftermath. The seed of clover is usually obtained from its second cutting. In connection with landscape effects meadows and pasture-lands are grouped together, and it is one of the beautiful effects of cultivated crops in scenery that their different colors and modes of growth checker a landscape with varieties of light and shade never seen where there is no cultivation. A meadow before the cutting, by the side of one recently cut, makes a contrast as of two different crops, more marked than the contrast between the uncut meadow and the pasture-field. There is no season of the year when lights and shadows in rural scenery are so charming as just after the harvest, or when the hay cutting is nearly done, and the shadows of trees and clouds are brightly outlined on their shaven stubble.

MEADOW SAFFRON. See COLCHICUM.

MEADVILLE, a city in n.w. Pennsylvania, incorporated 1866; on the e. bank of French creek at its entrance into the Alleghany river, and on the Atlantic and Great Western railroad; pop. '70, 7,103. It is the terminus of the Franklin branch railroad to Oil City, the center of a fertile agricultural region, well watered, and having a large production; and is a central shipping point, market, and depot for the oil regions. Petroleum oil, lumber, and grain are the chief products of Crawford co., in which it is situated, 100 m. n. of Pittsburg, 36 m. s. of Erie, and 24 m. w. of Titusville. It is the seat of a Unitarian theological seminary, established 1844, with a library of 12,000 vols., and of Alleghany college, a Methodist Episcopal institution, founded 1817, open to both sexes, having a library of 12,000 volumes. It has an elegant court house, 3 hotels, 15 churches, good public schools in handsome edifices, 6 banks, 2 of them national with a joint-capital of $300,000, a public library of 3,000 vols., a state arsenal, 4 newspapers, and an opera house. It has a public park; and Greendale cemetery, pleasantly located and tastefully laid out, is in the immediate vicinity. Its leading industries, which are important, are the manufacture of agricultural implements, carriages, engines, wooden shoes, edge tools, paper, and woolen goods; and it has oil refineries, machine shops, and extensive railroad repair shops.

MEAGHER, a co. in central Montana, having the Missouri river for its w. boundary, drained in the s.e. by the Muscleshell river, an affluent of the Missouri, and in the n.e. by

the head waters of the Judith river; 7,650 sq. m.; pop. '80, 2,744—2,095 of American birth, 285 colored. Its surface is composed of mountain, plain, and valley; its plains stretching out for miles treeless and verdureless, covered with the short brown buffalo-grass, with no break to the monotony but the telegraph poles, 30 to a mile, along the river, and the print of wagon wheels, the double track of the team, and the single track of the pony by its side. In other sections the mountains of the Belt and Snowy range rise into steep buttes, round and smooth, or jagged by the action of the atmosphere, around whose sides the road cautiously winds, or precipitates itself through narrow cañons overlooking the beautiful green lawns of the Judith valley, where suddenly appears the "shack" (log house) and wood-pile of the frontiersman, the harbinger of swift-coming civilization. In this wide, fertile valley the soil is adapted to stock-raising, and the culture of all northern products that will survive its winters. It contains some of the best land in that part of the country for the cultivation of apples and pears; and butter is one of the chief commodities. It is being rapidly settled by emigrants from the southern and western states, and its agricultural products are beginning to attract notice. Placer mining of gold in the mountains has been the greatest source of its wealth. Seat of justice, Diamond City.

MEAGHER, THOMAS FRANCIS, 1823–67; b. Waterford, Ireland; educated at the Jesuit college of Clongowes Wood, and Stonyhurst college, Lancashire, Eng. He was a close and earnest student, and in 1842 was awarded the silver medal for English composition, defeating more than fifty English students. On completing his studies he interested himself in Irish politics, and became one of the "Young Ireland" party; and, displaying great oratorical powers, was a very popular leader. On the outbreak of the French revolution in 1848 he was sent to Paris to congratulate the republican leaders. On his return to Ireland he was arrested on a charge of sedition, held to bail, afterwards tried for high treason, found guilty, and sentenced to death; but subsequently the sentence was changed to banishment for life to Van Diemen's Land. He was accordingly transported thither, but escaped in 1852, and succeeded in reaching New York. Here, for two years, he devoted himself to lecturing, with great success. In 1855 he commenced practice at the New York bar, and the following year became the editor of the *Irish News*. At the beginning of the rebellion in 1861 he organized a company of zouaves, joined the 69th regiment, N. Y. volunteers, was acting maj. at first Bull Run, and after serving the three months of the first call, returned to New York and organized the Irish brigade, being commissioned brig. gen. Feb. 3, 1862. He was engaged in the seven days' battles, at Manassas, and at Antietam, being specially commended by gen. McClellan in his report of the latter engagement. At Fredericksburg he was seriously wounded in the leg while charging with his men on Marye's heights, and was incapacitated for further fighting. He resigned temporarily, but was recommissioned in 1864, and held command in Tennessee and Georgia, performing distinguished service. In 1864 he was appointed secretary of Montana territory, and for some time performed the duties of governor in the absence of that official. On July 1, 1867, he fell from the deck of a steamer, at fort Benton, on the upper Missouri, and was drowned. He was at the time traveling to take measures for the protection of the white settlers in that region, threatened by the Indians. One of his last acts was to contribute to the pages of *Harper's Magazine* a most entertaining paper entitled "Rides through Montana," and which was designed to be the first of a series. Three weeks before his death he wrote to his publishers as follows: "Ever since I dispatched to you the text of my paper on Montana I have been in the field 200 miles from here against the Sioux and other implacable red devils." He published, also, *Speeches on the Legislative Independence of Ireland;* and *Last Days of the 69th New York Regiment in Virginia.* He was a man of brilliant and versatile capacity, and a soldier of unfailing resources and marked personal daring.

MEAL (Sax. *mæl*, a part or portion; Ger. *mahl*), a portion of food taken at one time, a repast. The number of meals eaten per day has varied at different times and in different countries. Among the Greeks and Romans of the classic ages, it was the general practice to have the principal meal toward evening, a light meal in the morning, and another in the middle of the day. The *akratisma*, *ariston*, and *deipnon* of the Greeks, corresponded nearly to the breakfast, luncheon, and dinner of our own country at the present time; the first was taken immediately after rising in the morning, the second about midday, and the *deipnon*, the principal meal, often not till after sunset. In Rome of the Augustan age, the three corresponding meals were *jentaculum*, *prandium*, and *cæna*. The two former were simple and hasty, except among persons of luxurious habits, with whom the midday meal was sometimes of an elaborate description. The *cæna*, taken in the evening, consisted of three courses, with often a great variety of viands. Reclining was the usual posture at meals for the men, the women and children sitting. Two persons, and occasionally three, reclined on one couch. Before a guest took his place at table, his shoes were taken off, and his feet washed by an attendant.

In mediæval and modern Europe, the prevailing practice, down nearly to the middle of last century, was to have three meals in the day, the midday and not the evening meal being the principal one. The habits of all classes were early; four was a usual hour for rising, and five for breakfast. Twelve was the dinner-hour, when it was the usage in England, down to queen Elizabeth's time, for every table, from that of the twenty-shilling freeholder to the table in the baron's hall and abbey refectory, to be open

to all comers, with free fare, bread, beef, and beer. Supper followed in the evening, a less abundant repetition of dinner. In the course of the last 120 years, a revolution has been going on in the hour of dinner, which has gradually got later till it has reached the present usage of from six to eight in the evening among the more cultivated classes. The introduction of tea and coffee has, to a certain extent, changed our habits as regards meals. They form an essential part of our breakfast, which is later than that of our ancestors, from nine to ten. The meal called tea is but a part of dinner, and supper, as a regular meal, has nearly disappeared. A light meal, called luncheon, is often taken between breakfast and dinner. Our dinner has therefore come nearly to correspond with the supper of our ancestors. This change of hours has brought with it one important change to the better in social habits; the excessive drinking, so common during the Georgian era, even among people of refinement, has disappeared; the long carousals of that period have been abridged to an hour, or half an hour, spent over wine after dinner. In Britain, dinner is, more than anywhere else, made a social meal, and an occasion of meeting one's friends; and public dinners, with toasts and after-dinner speeches, are a characteristically British mode of celebrating any public event or anniversary. In France and Italy, the gradual advance of the dinner-hour has not proceeded further than four or five o'clock. In Germany, the usage still obtains, to a large extent, of an early dinner and a supper. One o'clock is a usual dinner-hour, and even the court hour has hardly advanced beyond three and four. In Vienna, and some other parts of Germany, it is not uncommon to have five meals a day—breakfast, luncheon, dinner, tea, and supper.

MEAL. See BREAD.

MEAL-TUB PLOT. An attempt at conspiracy which Dangerfield made in 1679 against James duke of York; so called because the paper containing the scheme was hid in a tub of meal in the house of Mrs. Cellier. Dangerfield, having at length admitted that the whole affair was a forgery, was whipped and compelled to stand in the pillory.

MEAL-WORM, the larva of *tenebrio molitor*, a coleopterous insect of a genus allied to *blaps* (q.v.), but possessing wings and wing-covers. The perfect insect is of a pitchy or dark chestnut color, smooth, about half an inch long, with short 11-jointed antennæ, and stout legs. It is a common insect in Britain, most active in the evening, abounding in granaries, mills, and houses in which considerable stores of meal or flour are kept; as its eggs are deposited among these substances, on which the larva feeds, often doing considerable injury. Stores of ship-biscuit often suffer from this cause. The larva is about an inch long, thin and round, of an ocherous color, with bright rusty bands, very smooth and glossy, with six small feet, and two very short antennæ.—Another species, *T. obscurus*, has been introduced with American flour, and has become pretty common in some parts of Britain. The insect is of a dull black color above; the under parts, legs, and antennæ, chestnut. The larva is shining and pale brown.—Cleanliness and care are the best preventives of these pests. Meal-worms are a favorite and excellent food of caged nightingales.

MEALY BUG, *Coccus adonidum*, an insect naturalized in our hot-houses, and very injurious to pine-apples and other plants. It is reddish, and covered with a white powdery substance. See COCCUS.

MEAN, in mathematics, is a term interpolated between two terms of a series, and consequently intermediate in magnitude. The *geometric mean* (q.v.) of two numbers is always less than the *arithmetic mean* (q.v.), and greater than their *harmonic mean;* and the geometric mean is itself a geometric mean between the two other "means."

MEANS, ALEXANDER, D.D., LL.D., b. Statesville, Iredell co., N.Y., in 1801; was educated at the academy at Statesville; removed to Georgia in 1822, and after teaching school for four years attended medical lectures at Transylvania university, Ky., and commenced the practice of medicine in Covington, Ga., 1826; the same year was licensed to preach by the Methodist Episcopal church. In 1834 he was appointed to superintend the manual labor school near Covington; was chosen professor of the natural sciences at Emory (now Oxford) college. After a service here of 18 years, he was appointed in 1840 professor of chemistry and pharmacy in the medical college of Georgia, at Augusta, lecturing in winter, and performing his duties as professor in Oxford college 8 months of the year. In 1853 he presided over the masonic female college in Covington; was called to the presidency of Emory college in 1854, and shortly after to a professorship of chemistry in the Atlanta medical college, accepting the latter and retaining it for 12 years. In 1851 he traveled in Europe. In the state convention of 1861 he spoke and voted against secession, but afterwards identified himself with the south. He has held since the war the position of state agricultural chemist at Savannah, retaining at the same time his connection with Emory college. He has published *Centennial of Chemistry*.

MEARES, JOHN, 1746–1801, b. England; entered the navy in 1776; served against the French in the West India islands; became captain in the merchant service after the peace of 1783; went to India and formed at Calcutta what was called the *Northwest America company* for opening trade with Russian America. In 1786 he explored a

part of the coast of Alaska; went to China by way of the Sandwich Islands; entered Nootka sound, 1789; examined and took possession of the neighboring coasts in behalf of England, and reached Macao Dec. 5, 1789. He published *Voyages made in the years 1788-89 from China to the northwest coast of America*, 2 vols.

MEARIM RIVER; in Brazil, called also the Miarim and the Maranhao, rises in the n. central part of the province of Maranhao, and follows a general northerly direction, emptying into the bay of São Marcos. It has many affluents, of which the most important is the Pindare. Its entire length is about 350 m.; it is navigable, and several steamers ply upon it. The river is specially notable for the tremendous force of its current, which for a long time resists the action of the tide, and is at last overcome with a roaring sound and an exceedingly swift rush upward of the waters.

MEARNS. See KINCARDINESHIRE.

MEASLES (known also as RUBEOLA and MORBILLI) is one of the group of blood-diseases termed *Exanthemata* (q.v.), although, from the eruption which appears on the surface of the body, it is sometimes classed with the skin-diseases. It is communicable from person to person, and seldom occurs more than once in the same individual. Its period of incubation—that is to say, the time that elapses between exposure to the contagion and the first appearance of the febrile symptoms which precede the eruption—is usually about a fortnight; then come lassitude and shivering, which are soon followed by heat of skin, increased rapidity of the pulse, loss of appetite, and thirst. The respiratory mucous membrane is also affected, and the symptoms are very much the same as those of a severe cold in the head, accompanied with a dry cough, a slight sore throat, and sometimes tightness of the chest.

The eruption which is characteristic of the disease usually appears upon the fourth day from the commencement of the febrile symptoms and the catarrh—seldom earlier, but not unfrequently some days later. It is a rash, consisting at first of minute red papulæ, which, as they multiply, coalesce into crescentic patches. It is two or three days in coming out, beginning on the face and neck, and gradually traveling downwards. The rash fades in the same order as it occurs; and as it begins to decline three days after its appearance, its whole duration is about a week. The red color gives way to a somewhat yellowish tint, and the cuticle crumbles away in a fine bran-like powder; the process being often attended with considerable itching.

There are two important points in which it differs from small-pox (q.v.), with which in its early stage it may be confounded; these are—1. That the fever does not cease or even abate when the eruption appears, but sometimes increases in intensity; and (2), that the disease is not more severe or more dangerous because the eruption is plentiful or early. The character of the eruption, after the first day, will serve to remove all doubt regarding these two diseases; and the comparative prevalence of either disease in the neighborhood will materially assist in forming the diagnosis. It is distinguished from scarlet fever (q.v.), or scarlatina, (1), by the presence at the outset of catarrhal symptoms, which do not occur in the latter disease, at any rate, prior to the eruption; (2), by the absence of the throat-affection, which always accompanies well-marked cases of scarlet fever; (3), by the character of the rash, which in measles is said to present somewhat the tint of the raspberry, and in scarlet fever, that of a boiled lobster; which in measles appears in crescentic patches, and in scarlet fever is universally diffused; which in measles usually appears on the fourth day, and in scarlet fever on the second day of the disease.

In ordinary uncomplicated measles, the prognosis is almost always favorable. The chief danger is from inflammation of some of the textures that compose the lungs; and in scrofulous children, it often leaves chronic pulmonary mischief behind it. No age is exempt from the disease, but it is much more common in childhood than subsequently. The reason is probably that most persons have it in early life, and are thus protected from an attack at a later period.

In mild forms of the disease, nothing more is requisite than to keep the patient on a low diet, attend to the state of the bowels, and prevent exposure to cold, which is best accomplished by keeping him in bed with the ordinary warmth to which he is accustomed in health. If the chest symptoms become urgent, they must be treated according to their nature. Bronchitis (q.v.), sometimes extending into pneumonia (q.v.), is most to be feared. If the eruption disappear prematurely, it may sometimes be brought back by placing the patient in a warm bath. In such cases, stimulants are often required, but must, of course, only be given by the advice of the physician. The patient must be carefully protected from exposure to cold for a week or two after the disease has apparently disappeared, as the lungs and mucous coat of the bowels are for some time very susceptible to inflammatory attacks.

MEASURE, in music, is a term applied to the quantity of notes which are placed in the bar, and which is generally called the *time*, of which there are but two kinds, viz., common time, containing an equal quantity of notes in the bar, and triple time, containing an unequal quantity. Common time is generally marked with a C at the beginning, which means that every bar contains four crotchets, or their value in other notes. There are also other kinds of common time, which are marked $\frac{2}{4}$, $\frac{6}{4}$, $\frac{6}{8}$. Triple time is

marked $\frac{2}{2}$, $\frac{2}{4}$, $\frac{2}{8}$, $\frac{2}{8}$, $\frac{2}{4}$. Sometimes, in common time, we have $\frac{1^2}{4}$, $\frac{1^2}{8}$. The lower figure indicates the parts of the semibreve, and the upper figure shows how many of these parts there are in the bar.

MEASURE OF DAMAGES, the body of rules which governs the amount of pecuniary compensation awarded by courts of justice for violation of personal or property rights. In its most extended sense it might be said to cover almost the whole ground of legal procedure; but is used not to represent inquiry as to what cases require the award of damages, but rather, as to what limit should be placed on the award in certain cases. The rules apply to common law rather than to equity, as the former is, in general, remedial in its nature, and the latter preventive, offering injunctions, specific relief, etc. In early English law the question of damages was left to the jury, while in countries whose jurisprudence is founded on the civil law, the question was left to the discretion of the magistrate; but common law declares that the compensation must be fixed by those legal rules which form the Measure of Damages; though these are not as yet free from contradiction and discrepancy. "The general rule," says Story, "is that whoever does damage to another, is liable in damages to the *extent* of that injury; it matters not whether it is to the property or person or rights or reputation of another." But not every loss gives right to legal relief; the injury must be *legal*. Thus injury to moral sentiments has no remedy. Suit cannot be sustained by a private individual for a public wrong, as a highway nuisance, unless there be some element of special injury to him. Injury may consist in direct or indirect pecuniary loss, value of time, expenses such as costs and counsel fees, mental suffering and the sense of wrong or insult arising from the intention to vex or annoy. But the law will refuse to give compensation for any of these kinds of injury except direct pecuniary loss and the costs of the suit, unless, indeed, there be present the element of malice and willfulness; or, as has been said, it will divide the loss, discriminating between that which must be borne by the offending party and that which must be borne by the sufferer; but where there is fraud, malice, or gross negligence, vindictive or exemplary damages will be given. In quantity, the damages may be nominal or substantial; nominal when there is *injuria sine damno*, legal injury but no actual loss. The giving of nominal damages often suffices to establish rights or titles, as in action for trespass on lands. It is well settled in American law that where there is *any* invasion of right there must be at least nominal damages, and it is often the duty of the court to so instruct the jury. In such cases care should be taken not to hold the defendant for costs, if the action is trifling and tinged with malice.

What may be included under consequential damages? Usually the consequences must be direct and immediate; in the words of the N. Y. supreme court, "must be the fair natural and legal result of the breach of the defendant's agreement. Prospective or continuing profits are usually excluded, if not very clearly the natural result." Thus in a suit for price of a steamer, the profits on trips she might have made were disallowed. But when goods have deteriorated in market value the courts will give compensation for the loss. If there is no element of contingency and the profit was certain and actual, it will be admitted. In torts, also, the damages are confined to direct consequences, but incidental expenses are sometimes allowed. In a case where an anchor was warranted, it was held that the holding of the cable was of the essence of the warranty, and it was even implied that if the ship were lost by the imperfection of the anchor, a suit would lie for its value. If an act is illegal or mischievous of itself the courts will go far in construing the law of consequential damages. If a plaintiff could have avoided the injury without loss or danger he cannot recover; and this law of contributory negligence is very important in torts such as nuisance or collision. As to award of costs, there is some conflict; but they usually go with the verdict, unless the suit be vexatious and won on mere technical rights. Though, as a rule, damages are only allowed for injury up to the time action is brought, yet in many cases of contracts where successive suits are impossible from the *entirety* of the contract, and in torts and trespass, greater latitude is allowed. If, in a continuing agreement the violation has, of necessity, entailed loss after the bringing of action and if the loss is certain and ascertainable, prospective damages will be given. And in torts the averment may be of loss *probable;* as, in case of injury by negligence of a railroad, it may be set forth that plaintiff's health is permanently injured. In case of a contract to pay money, there can be no consequential damage beyond legal interest; if it be to do or not do some act, the law will consider only those consequences which seem to have been in the contemplation of the parties at the time; and in case of torts in which no fraud or malice enters, only natural and proximate consequences are considered. In regard to real estate, it was formerly thought to be in the very nature of actions for possession that damages did not lie; but there has been much statutory enactment on the subject, and damages are now generally allowed in actions of ejectment and dower. In the first, the damage in the actual ejectment is almost always nominal; but, though the improvements pass with the land, *mesne profits* are given to the plaintiff to the extent of the annual value, as well as costs and sometimes interest and compensation for his trouble. In New York, for instance, interest is allowed on rents, but all *equitable* defenses are admitted. In dower the English law of damages is governed by the statute of Merton, and it is generally held here that damages accrue after a husband's death and are to be measured by one-third the mesne profits:

but the usual course in dispossession from dower land is by action of ejectment, the old writ of dower having fallen in disuse. Without going into details as to the measure of damages in cases of trespass, waste, nuisance, and real covenants, it may be said that with few exceptions the general rule of natural relation and compensation for actual injury governs. In contracts, many and important classes are presented, such as negotiable paper, insurance, sale and warranty of chattels, agency and suretyship. In all these the jury has lost much of the power possessed in former times, and it is well settled that it is for the court to determine the measure of damages and for the jury only to determine the amount under that rule. It is clear that the motives of the contracting parties do not fix the rule, though in breach of promise of marriage the jury may take all facts into consideration, as it is impossible to formulate a law of damages which will cover the peculiar injury. Other exceptions exist; but, where the contract is not unconscionable, it furnishes the measure of damage itself. Contract price is recoverable and actual loss is the basis of compensation, so that *quantum meruit* applies. With all negotiable paper the measure is easily and arbitrarily fixed by the legal rate of interest. Marine insurance has special laws arising from the nature of the peculiar doctrines of general average and total and partial loss; in fire insurance the actual loss is the measure; while in life insurance no actual loss need be shown by the assignee of a policy. In contracts for the sale of personal property, the vendee after breach of contract by the vendor can, by the usual rule, recover only the difference between the contract price and that on the day fixed for delivery; but it has been held in cases involving stock transactions that the vendee can recover the highest price reached by the stock in the interval. The vendor can recover full price as against the vendee on refusal of the latter to receive the goods, even though they are not actually delivered. Warranty of personal property is governed as to damages by the actual value and not the contract price, if there be no fradulent representations. The principle has been disputed but is now well settled in this country. A surety must pay the claim he guarantees before he can sue his principal, and his damage is measured by the amount, interest, and costs. An agent can be sued by his principal for the whole loss incurred by his negligence, even though not the direct consequence of his act; and in such cases cannot offset his commission. In actions against common carriers indemnity is afforded for actual loss at time of injury; the value of goods destroyed is estimated at the place of destination and interest is reckoned under the law of that state. Where transportation of a passenger is refused, after contract to do so, the injury by loss of time and wages or profits is the measure. But the loss must be actual; thus the rate of wages in the plaintiff's trade at the place of destination was admitted as evidence of probable loss but not to set the measure of damage; and courts have even said that the expenses of an illness following but not caused by railroad detention and prolonging such detention might be included in the damages, so far as they were in excess of what they would have been elsewhere. Where a telegraph company undertook to transmit a message and, by their negligence, plaintiff lost a chance to collect an otherwise worthless debt, the corporation was held to be a common carrier and liable. Other decisions are averse to this doctrine. Dispute on the point is usually avoided by provisions made part of the contract, disclaiming such responsibility. If the company is a common carrier it is, in effect, an insurer, is bound to use more more than ordinary care, and liable for consequential damages.

Interest is always allowed when a sum is to be paid at a certain time, the law assuming that legal interest begins at that date; and the courts of this country have been very liberal in inferring that an understanding for interest existed; but if claims are uncertain or unliquidated, interest will not be allowed. A most important distinction exists between liquidated damages and a fixed sum agreed upon as a *penalty*, as in bonds. In the first case the parties have fixed a sum certain as the measure of damage from breach of contract; but the courts will often refuse to consider the amount as intended to be absolute and will measure the actual loss. The intent of the parties on the point must govern rather than the language. The tendency in this country is to frequently consider a stipulated sum as liquidated damages and but rarely to regard it as a penalty; and the first, especially if there is appearance of usury or oppression; and, if there is nothing to certainly determine the damages *outside* of the stipulation, they will invariably be considered liquidated. Recoupment and set-off will be allowed even where the demand is not for a liquidated sum.

Vindictive or exemplary damages have already been referred to. The principle applies mainly in cases of tort and very materially enlarges the considerations regarded in fixing the measure of damages. Where there has been maliciousness or fraud or evil intent, the jury may go beyond the principle of compensation and punish defendant by heavier damages. In torts the intent of the wrong-doer is of great moment, and though it may seem incongruous that the penalty should be paid to the plaintiff rather than to the state, yet in practice it is the most effective mode of punishment. The rule that the jury may take evil intent into consideration is now well settled both in England and in the United States. In cases of libel and slander the law will often not require the least proof of actual injury, a distinction being drawn between words actionable *per se* where damage is presumed, and other libels in which actual injury must be set out. The subject of measure of damages will be found treated in detail in works devoted to the special topic by Maine, Field, and Sedgwick, and its application to various branches of

jurisprudence is set forth under many heads in Parsons *On Contracts*, Greenleaf *On Evidence*, and Redfield's *Railroad Law*.

MEASURES. See WEIGHTS AND MEASURES, *ante;* METRIC SYSTEM.

MEAT EXTRACT, a substance of a composition varying with the process employed, extracted from beef or mutton or other animal flesh, and used as an article of diet. The well known common beef tea is made in various ways, and differs greatly in strength. A common method, and perhaps the best when required fresh and condensed, is to put the chopped meat without the addition of any liquid in a bottle and immerse this in a vessel of water at about 180° F. The blood, lymphatic, and muscular juices ooze out of the meat and form a red liquid containing a large amount of soluble nutritious proteine matter. If this is heated to the boiling point, there will be considerable coagulation and the fluid extract will not be so easily digestible. If the meat, on being heated to about 180° F. be pressed, most of the nutritious substances will be expressed, and the extract so obtained, on being evaporated, may be brought to any desirable degree of solidity. This solid extract, by the addition of common salt, can be kept, especially in closed jars, an indefinite length of time, and makes, when mixed with hot water, an excellent beef tea for the sick room. Another method of making beef tea is very common, and in many cases perhaps the best, because it is seldom that it is desirable to have it in too condensed a state. Patients require considerable drink, and this is conveniently given in well-seasoned beef tea, made by heating chopped beef in water to about 200° sufficiently long to extract most of the nutritious material. It is more palatable than that extracted by the bottle process, and for food and drink combined is in most cases superior. A portion of the meat may also be boiled and made into a broth, where the patient's stomach is in a condition to digest it readily. The albuminoids are, of course, precipitated by boiling, but the shreddy precipitate may be taken with the clear liquor often with benefit.

MEATH, a maritime co. of the province of Leinster, Ireland, bounded on the e. by the Irish sea and the county of Dublin; area, 906 sq.m., or 580,083 acres, of which 547,391 are arable, about 30,000 waste, bog, etc. Pop. '51, 140,748; '61, 110,575; '71, 95,558, of whom 89,140 are Roman Catholics, 5,826 Protestant Episcopalians, the rest Protestants of other denominations. The surface is for the most part an undulating level, forming the eastern extremity of the great limestone plain of Ireland, and rising slightly towards the n. and north-west. No minerals of any importance are found. The soil is a rich loam, and extremely fertile; but it has long been devoted almost entirely to pasture; the total extent under crops in 1876 being only 140,720 acres. In the same year the cattle amounted to 170,349, the sheep to 217,065, and the pigs to 17,085. The chief rivers are the Boyne and Blackwater. The principal towns are Trim, Navan, and Kells, in the first of which the assizes are held. Meath possesses abundant means of communication, being intersected by numerous roads and several railways, also by the royal canal. The coast-line, about 10 m., has no port of importance, even as a fishing-station. The occupation of the people is almost wholly agricultural. The number of children attending the national schools in 1875 was 16,972. Anciently, Meath, which included West Meath, and probably portions of several other adjacent counties, formed one of the kingdoms into which Ireland was divided, the royal seat being the celebrated Temor or "Tara of the kings," the scene of the first preaching of Christianity under St. Patrick. After the English invasion, Meath was early occupied by Strongbow, and was erected into a county palatine by Henry II., who conferred it on Hugh de Lacy. From this time forward, it was the scene of many conflicts. In the end of the reign of Henry VIII. it was separated into e. and w. Meath. Few Irish counties present so many interesting relics of Irish antiquities of all the various periods. Celtic remains abound along the Boyne and Blackwater. The earthworks of the ancient royal seat at Tara are still discernible, and some valuable and highly characteristic gold ornaments were there discovered. John's castle at Trim is one of the most extensive monuments of English rule in Ireland. The round tower and sculptured crosses of Kells are singularly interesting; and almost every parish in the county contains some relic of the feudal or ecclesiastical structures which formerly covered the land. Meath returns two members to parliament.

MEAUX, a t. of France, in the department of Seine-et-Marne, on the river Marne, 25 m. e.n.e. of Paris. It is a bishop's see, and its cathedral, begun in the 11th c., is a noble Gothic structure. Bossuet, the famous preacher, was bishop here, and is buried in the choir. Corn and flour from the water-mills on the Marne are sent to Paris in large quantities, and there are manufactures of cotton and other cloths, pottery, leather, saltpeter, etc. Pop. '72, 9,528.

MECCA (*Om Al Kora*, mother of cities), one of the oldest towns of Arabia, the capital of the province of Hedjaz, and, through being the birthplace of Mohammed, the central and most holy city of all Islam. It is situated in 21° 30′ n. lat., and 40° 8′ e. long., 245 m. s. of Medina, and about 65 m. e. of Jiddah, the well-known port on the Red sea, in a narrow, barren valley, surrounded by bare hills and sandy plains, and watered by the brook Wadi-Al-Tarafeyn. The city is about 1500 paces long, and about 650 broad, and is divided into the upper and lower city, with about 35 chief quarters. The streets are broad and rather regular, but unpaved; excessively dusty in summer, and muddy in

the rainy season. The houses, three or four stories high, are built of brick or stone, ornamented with paintings, and their windows open on the streets. The rooms are much more handsomely furnished, and altogether in a better state than is usual in the east; the inhabitants of Mecca making their living chiefly by letting them to the pilgrims (see HAJJ) who flock here to visit the Beit Ullah (house of God), or chief mosque, containing the kaaba (q.v.). This mosque, capable of holding about 35,000 persons, is surrounded by 19 gates surmounted by seven minarets, and contains several rows of pillars, about 20 ft. high, and about 18 in. in diameter, of marble, granite, porphyry, and common sandstone, which at certain distances are surmounted by small domes. A great number of people are attached to the mosque in some kind of ecclesiastical capacity, as katibs, muftis, mueddins, etc. No other public place or building, sacred or profane, of any importance is to be found in this city, which also is singularly destitute of trees and verdure of any kind. It is protected by three castellated buildings, and is governed by a sherif. The population has, in consequence of the rapidly decreasing number of pilgrims, fallen off considerably of late, from above 100,000 to hardly 40,000, who do not find the 100,000 annual pilgrims sufficient to keep them in the state of prosperity of former years. The trade and commerce of Mecca hardly deserve mention; the chief articles manufactured there are chaplets for the pious pilgrims. The townspeople themselves are lively, polished, and frivolous, and growing up amid an immense concourse of strangers from all parts of Asia, are generally able to converse in three or four eastern languages. Respecting the history of Mecca, it was known to Ptolemy already as Macoraba, and first belonged to the tribe of the Kosaites, later to the Koreish. Mohammed, who had been obliged to leave it precipitately (see HEDJRAH) in 622, returned to it and conquered it in 627. Within the course of the present century, Mecca was taken by the Wahabites (1803), but given up again to the pasha of Egypt, Mehemed Ali (1833), whose son, Ibrahim, was made Sheik El Haram—"of the sacred place." At present, however, Mecca is directly dependent on the sultan.—A certain balm, called balm of Mecca, is made from a plant which grows in abundance in the neighborhood of the city, called *besem.*

MECCA BALSAM. See BALSAM OF BALM OF GILEAD, *ante.*

ME'CHAIN, PIERRE FRANCOIS ANDRÉ, 1774–1805; b. France; studied for a time at the school *des Ponts et Chaussées*, which he was compelled to leave for want of money. He then gave instruction in mathematics, giving all his spare time to the study of astronomy. Soon afterwards he was accidentally brought to the notice of Lalande, who had bought of him an astronomical instrument, which poverty had obliged him to sell. Lalande secured him a place as government hydrographer. In this capacity Mechain drew up a number of marine charts, and made a survey of a part of the French sea-coast. He still pursued his astronomical studies, investigated the theory of eclipses, calculated the orbits of 24 comets, and discovered 11. The academy of sciences gave him its prize for his paper on the comet of 1530, and in 1782 he was elected to membership of the academy. In 1791 he was employed, at the suggestion of the academy, to measure a portion of the arc of the meridian between Dunkirk and Barcelona, which the national convention had selected to form the basis of their new system of measures. He continued his observations at the Paris observatory after his return from Spain. Under the auspices of the French board of longitude he went once more to Spain to continue his measurements of the arc of the meridian, but he was taken ill soon after his arrival and died at Castellon. His publications were not numerous; they are papers chiefly on eclipses and the theory of comets, contributed to the *Transactions* of the academy of sciences, and to the *Connaissance du Temps* of which he was at one time editor.

MECHANICAL CALCULATION. See CALCULATING MACHINE, *ante.*

MECHANICAL POWERS—MACHINES. Machines are instruments interposed between the moving power and the resistance, with a view of changing the direction of the force, or otherwise modifying it. Machines are of various degrees of complexity; but the simple parts, or elements of which they are all composed, are reducible to a very few. These elementary machines are called the MECHANICAL POWERS, and are usually reckoned as six in number, three being primary—viz., the *lever, inclined plane,* and *pulley;* and three secondary, or derived from the others—viz., the *wheel-and-axle* (derived from the lever), the *wedge,* and the *screw* (both derived from the inclined plane). To these some add toothed-wheels. What is special to each machine will be found under its name; a few observations applicable to all may appropriately be made here. 1. In treating of the theory of the lever and other mechanical powers, the question really examined is, not what power is necessary to move a certain weight, but what power is necessary to balance it; what force at P, for instance (see LEVER, fig. 1), will just keep W suspended. This once done, it is obvious that the least additional force to P will suffice to begin motion. 2. In pure theoretical mechanics, it is assumed that the machines are without weight. A lever, for instance, is supposed to be a mere rigid line; it is also supposed to be *perfectly* rigid, not bending or altering its form under any pressure. The motion of the machine is also supposed to be without friction. In practical mechanics, the weight of the machine, the yielding of its parts, and the resistance of friction, have to be taken into account. 3. When the effect of a machine is to make a force overcome a resistance greater than itself, it is said to give a *mechanical advantage.* A machine,

however, never actually increases power—for that would be to create work or energy, a thing now known to be as impossible as to create matter. What is gained in one way by a machine is always lost in another. One lb. at the long end of a lever will lift 10 lbs. at the short end, if the arms are rightly proportioned; but to lift the 10 lbs. through 1 ft., it must descend 10 feet. The two weights, when thus in motion, have equal momenta; the moving mass multiplied into its velocity, is equal to the resisting mass multiplied into its velocity. When the lever seems to multiply force, it only concentrates or accumulates the exertions of the force. The descending 1 lb. weight, in the case above supposed, may be conceived as making 10 distinct exertions of its force, each through a space of a foot; and all these are concentrated in the raising of the 10 lb weight through 1 foot. The principle thus illustrated in the case of the lever holds good of all the other mechanical powers. 4. The object of a machine is not always to increase force or pressure; it is as often to gain velocity at the expense of force. See LEVER. In a spinning-factory, e.g., the object of the train of machinery is to distribute the slowly working force of a powerful water-wheel or other prime mover, among a multitude of terminal parts moving rapidly, but having little resistance to overcome. 5. The mechanical advantage of a compound machine is theoretically equal to the product of the separate mechanical advantages of the simple machines composing it; but in applying machines to do work, allowance must be made for the inertia of the materials composing them, the flexure of parts subjected to strains, and the friction which increases rapidly with the complexity of the parts; and these considerations make it desirable that a machine should consist of as few parts as are consistent with the work it has to do. 6. The forces or "moving powers" by which machines are driven are the muscular strength of men and animals, wind, water, electrical and magnetic attractions, steam, etc.; and the grand object in the construction of machines is, how, with a given amount of impelling power, to get the greatest amount of work of the kind required. See WORK, FOOT-POUND. This gives rise to a multitude of problems, some more or less general, others relating more especially to particular cases—problems, the investigation of which constitutes the science of applied mechanics. One of the questions of most general application is the following: If the resistance to a machine were gradually reduced to zero, its velocity would be constantly accelerated until it attained a maximum, which would be when the point to which the impelling force is applied was moving at the same rate as the impelling force itself (e.g., the piston-rod of a steam-engine) would move if unresisted. If, on the other hand, the resistance were increased to a certain point, the machine would come to a stand. Now the problem is, between these two extremes to find the rate at which the greatest effect or amount of work is got from the same amount of driving power. The investigation would be out of place here, but the result is that the greatest effect is produced when the velocity of the point of application is one-third of the maximum velocity above spoken of. The moving force and the resistance should therefore be so adjusted as to produce this velocity.

MECHANICS is the science which treats of the nature of forces and of their action on bodies, either directly or by the agency of machinery. The nature of force will be found treated of under FORCE. The action of forces on bodies may be in the form of pressure or of impulse, and may or may not produce motion. When the forces are so balanced as to preserve the body affected by them in a state of equilibrium their actions are investigated in that branch of mechanics called STATICS (q.v.); when motion is produced, they are considered under the head of DYNAMICS (q.v.) or *Kinetics*. The equilibrium and motion of fluids (including liquids and gases) is treated in the subordinate branches of HYDROSTATICS and HYDRODYNAMICS; though the special terms AEROSTATICS and AERODYNAMICS (for which the comprehensive term PNEUMATICS is often used) are sometimes employed to designate those portions of the science of mechanics in which the action of gaseous bodies is treated of

The science of mechanics owes very little to the ancient philosophers. They were acquainted with the conditions of equilibrium on the lever—discovered by Archimedes—and had reduced the theory of all the mechanical powers, except the pulley and the inclined plane and its derivatives, to that of the lever, but this was nearly all. Archimedes, starting from the principle of equilibrium on the lever, struck out the idea of a center of gravity for every body, and investigated the position of that point for the triangle, parabola, and paraboloid. Till the 16th c. the science remained stationary; Cardan, the marquis Ubaldi, and Stevinus—who was the first to give the correct theory of equilibrium on the inclined plane—then gave it a slight impetus, and the labors of Galileo, who introduced the expression of mechanical propositions in mathematical formulas, discovered the laws regulating the motion of falling bodies, and originated investigations concerning the strength of materials, placed the science on a broad and substantial basis. Torricelli, Descartes, Pascal, Fermat, Roberval, and Huygens, on the continent, and Wallis and Wren in England—the last three of whom simultaneously discovered the laws which regulate the collision of bodies—added each his quota to the *new science*, as mechanics was then called. In 1687 appeared Newton's *Principia*, in which the complete experimental basis of the subject was first laid down in a satisfactory manner, and the mechanical principles, which had before been considered to act only at the surface of the earth, were shown to rule and direct the motions of the planets.

Contemporary with Newton were Leibnitz and the two elder Bernouillis, James and John, who, besides contributing greatly to the advancement of the science, applied to it the newly-invented differential calculus, which was found to be a weapon of immense power. From this time a constant succession of illustrious men have prosecuted the study of theoretical mechanics, or of subjects connected with it. The chief names are Daniel Bernouilli, Euler, D'Alembert, Clairaut, Lagrange, Laplace. Lagrange's *Mécanique Analytique* not only systematized the subject but enormously increased its power and the range of its applications. The last great additions to the science are those made by Sir W. R. Hamilton (q.v.) under the name of the principle of *varying action*. The developments which this has received from Jacobi, Boole, Cayley, Liouville, Donkin, Bour, etc., form an extensive and difficult branch of applied mathematics, chiefly of the theory of simultaneous differential equations.

MECHANICS, ANIMAL. A moment's reflection shows that this subject is exhaustless, the application of forces and the variation in the mechanism being infinite, and this, without embracing molecular mechanics or kinematics, which would necessarily be involved in a minute study of the action of the nervous system. We must, therefore, content ourselves with a few brief general illustrations of the more obvious vital mechanical movements. The simplest examples are the hydromechanics of some of the lower infusoria, where the animal is propelled through its native element by the reaction of water forced out of a single orifice by the contraction of the simple cell which forms the body. Some of these minute animals have cilia which also serve as locomotive organs. Other hollow animals of a higher organization propel themselves through water in a similar manner, as those belonging to the sub-kingdom cœlenterata (q.v. in art. INVERTEBRATE ANIMALS). These animals are also provided with filamentary tentacles which have contractile properties, and the power of forming hooks or prehensile organs. The mechanism of the circulation in the *cydippe*, a cœlentrate belonging to the order Ctenophora is exceedingly interesting. It consists of a complex canal system, the tubular branches of which are lined by a ciliated endoderm for the purpose of keeping up within them the circulation of water. These animals, although no doubt assisted by the contractions of the body cavity, are propelled by certain organs called ctenophores, or parallel rows of cilia, which are arranged in comb-like plates longitudinally upon their globular or oval bodies. Some infusorial animals, as the rotifera or wheel animalcules, included in a higher sub-kingdom (annulosa), possess a highly mechanical organization, approaching somewhat, in that respect, the insects. The characteristic wheel organ consists of a retractile disk carrying numerous cilia which, by their successive rapid vibrations, produce the illusory appearance of a rotating wheel. The motions are regarded as having an action similar to that of a screw propeller, and as aiding in locomotion as well as serving to throw currents of water into the mouth. All the movements in these soft-bodied animals involve as complex mechanical principles as those which are exhibited in the action of muscles and tendons upon framework which serve as levers in the higher animals. The locomotion of fishes involves similar applications of force in the oblique manner in which the sides and tail fin are brought to act against the water in which they swim, and also in the position of the pectoral and other fins, which give direction, and are not—with the exception of the dorsal and caudal fins—organs of propulsion in ordinary swimming, as is sometimes supposed. When a fish is comparatively quiet he may change his position by the action of all the fins, and a backward motion is often produced by a paddle action of the pectoral and ventral fins. The oblique action of the sides of a fish against the water is of the same nature as that of a ship when tacking against the wind, or of the paddles of a screw propeller, or of an oar in sculling, or of a serpent in running through grass, and involves mathematical elements of all orders, from the simplest to the most complex.

The attempted solutions of the application of force in the locomotion of fishes, which represent the whole of the tail and latter part of the body as moving alternately from side to side, and producing alternate periods of retarding and of forward action, are founded upon erroneous views. No fish, not even the clumsiest, propels itself in accordance with such crude mechanical principles. The longitudinal line of the latter part of the body presents a number (depending upon the form and flexibility of the fish) of serpentine curves, of more or less depth, whose combined action produces (in the most rapid motions) an almost uniform forward propelling force, and in one direction, except when the fish curves its body for the purpose of turning, or altering its course. The body and tail fin do not oscillate in one curve, but the fin is always applied to the water in a direction which tends to propel the body forward, and its suppleness and flexibility are qualities given to it for this purpose. The complex mechanism displayed in the higher animals and in man is all the more interesting because of its involving the simpler principles of the mechanical powers, particularly the lever and pulley, as well as those of oblique action in fishes, which includes in its elements the principle of the inclined plane. The lines of force in the action of the muscles, as applied to the bones, undergoing, as they do, constant variation of direction, present, however, equally difficult mathematical problems if it is required to estimate the expenditure of power. The apparatus for mastication and deglutition in various classes of animals furnishes one of the most complex subjects of investigation, one, indeed, whose elements are, in their final results,

insolvable, on account of the constantly variable condition, quality, and quantity of food, involving, as it does, constantly varying applications of muscular force, and constantly varying capacity and form of the mouth and pharynx. Most of the movements are produced automatically, but the perfect adaptation of the mechanism to the required functions is none the less wonderful. The masticating apparatus in various animals is as various as the animals themselves, and one is adapted to the other so perfectly that many have adopted the idea that the development of the organism must have kept pace with the development of an appetite, or a change of circumstances. It is maintained by others, however, that there are facts in anatomy which render such progressive development hypotheses improbable; as, for instance, the arrangement of the superior oblique muscle of the eye-ball. One end of this muscle is attached to a part of the sphenoid bone at the bottom of the orbit; it then passes forwards to a cartilaginous ring or pulley which is attached to the frontal bone at the inner angle of the orbit, and becoming a rounded tendon it passes through this pulley and is then turned backward, becoming again muscular. It then expands into a broad band which is inserted into the sclerotic coat of the posterior and outer surface of the eye-ball. It is difficult to imagine how the force of an impending function, or any physiological want, could cause the development of such a piece of apparatus. It is so much of a contrivance, to all appearances, that the elements of design and of immediate creation cannot well be denied recognition. The internal mechanism of the eye-ball is held to afford as much evidence of design as that furnished by the superior oblique muscle. For the purpose of accommodating the eye to vision at different distances, among other provisions, the degree of convexity of the crystalline lens requires to be constantly changed. This is effected by the ciliary muscle, a circular organ situated at the outer border of the iris and at the junction of the cornea with the sclerotic coat. As examples of the "mechanical powers" in the mechanism of the human body, we find the cord and pulley in the arrangement of the superior oblique muscle of the eye, instanced above; the first kind of lever, that where the fulcrum is between the resistance and power, in the support of the head upon the *axis* (the upper cervical vertebra) and the depression of the occiput and elevation of the face by the contraction of the extensor muscles of the neck, and also in the arm when the extensor muscles act upon the olecranon process of the ulna. See SKELETON. The arm also affords an example of the third kind of lever when acted upon by the flexor muscles, the power being applied between the hand and elbow joint, which is the fulcrum. The raising of the body upon the toes is usually instanced as an example of the second kind of lever. It is evident, however, that if a person lies upon the back and places his toes against a resisting, but movable, object, and pushes it away, he will virtually be performing the same mechanical operation, as far as the foot is concerned, as when rising upon his toes, and the relations of the toe, the ankle joint, and the heel will be precisely the same; that is to say, the ankle joint will be the fulcrum, the application of the toe will be at the point of resistance, and the power will be applied by the tendo-achilles at the heel. In raising one's self upon the toes, therefore, the ankle joint is in reality a movable fulcrum. Moreover, the first and second kinds of lever are convertible into each other by making the resistance in the first kind stationary and causing the fulcrum to move. One of the most celebrated and elegant essays upon animal mechanism is the Bridgewater treatise for 1834, by Sir Charles Bell, on *The Hand, its Mechanism and Vital Endowments as Evincing Design.* The mechanical contrivance known as the toggle joint, sometimes spoken of as one of the mechanical powers, but which acts upon the principle of the inclined plane, is exemplified in the knee joint. When the knees are considerably bent it is difficult to raise a heavy weight, but as the legs become straighter the power over resistance becomes enormous. Of course the toggle, or knee joint, in this instance is moved by the application of muscles and tendons to levers whose arms (thighs and legs) are also the arms of the toggle joint. In reality the operation of raising the body from a sitting posture combines the principles of two mechanical powers, the lever and inclined plane, the hip forming a toggle joint as well as the knee. See TOGGLE JOINT.

The mechanics of aerial motion in birds furnishes one of the most interesting subjects of philosophical inquiry and physical research, and has been ably treated by the present duke of Argyle in a work called "The Reign of Law." See also in this cyclopædia the article on BIRDS. An examination of the anatomy of a bird is a source of never-ending admiration to the student of natural history. It reveals the most perfect adaptation of means to results—and results, too, which would seem impossible if one had never witnessed the phenomenon of aerial flight. To watch a bird—like one of the larger sea-gulls, poise itself without flapping its wings for a quarter of an hour or more, and when the wind is blowing, for an indefinite space of time, or as long as the bird can be seen, without descending from its altitude of several thousand feet, but floating aloft like a kite held by a cord, now rising with majestic motion, and now darting obliquely downward with immense speed—is one of the most fascinating of recreations. Scarcely less wonderful is the flight of insects, and perhaps none of the class possess the power in greater perfection than the common fly. See FLYING, *ante*, and INSECTS, *ante*.

MECHANICSBURG, a t. in s. Pennsylvania, incorporated 1826; in Cumberland co. in close proximity to the iron region, at the junction of the Cumberland valley railroad

and the Dillsburg branch; pop. '70, 2,569. It is 8 m. s.w. of Harrisburg, and 10 m. e. of Carlisle. It is the seat of the Cumberland Valley institute and the Irving college for women, and has excellent educational advantages in free schools, and a public library. It is lighted with gas and has an abundant water supply, and 5 hotels. Its industries are represented by manufactories of sashes and doors, paper mills, foundries, and spoke and bending works. It has a variety of stores, is the shipping point for iron ore, and a depot for supplies for the iron region.

MECHANICSVILLE, BATTLE OF, fought at the village of that name in Henrico co., Va., June 26, 1862. The battle-ground is within 7 m. of Richmond, and the intervening country was held by the confederates, commanded by gen. Lee in person, with his forces strongly concentrated immediately about the capital. Mechanicsville was occupied by the advance of the federal troops—a regiment of infantry and a battery. On the afternoon of the 26th the movement was begun by the confederate gen. A. P. Hill crossing the Chickahominy and advancing on the federals, who retired about a mile to a strongly intrenched position held by gen. Fitz John Porter, on the left bank of Beaver Dam creek. This movement uncovered the Mechanicsville bridge, and enabled gens. Longstreet and D. H. Hill to cross the river and march down its left bank with the design to attack the federal communications with the York river. But the federal position was discovered to be stronger than had been anticipated by gen. Lee when he made his plans; and the confederates found themselves exposed to a galling fire of artillery and musketry, the approaches to their line of battle being over open fields swept by their batteries. Continued assaults being unsuccessful, the confederates were forced to retire, with a loss of between 3,000 and 4,000; the federal loss being under 400, and only a portion of their force engaged. On the arrival of Stonewall Jackson the next day, the federal position was abandoned.

MECHERINO. See BECCAFUMI, DOMENICO.

MECHI, JOHN JOSEPH, b. London, 1802; of Italian descent; became in youth a clerk in a mercantile house, and in 1827 set up business for himself and opened a cutler's shop. Having obtained a patent for a "magic razor strop," he acquired a fortune from its sale, and in 1840 bought a farm of 170 acres at Tiptree Heath, Essex, making experiments in scientific agriculture. He was ridiculed for his experiments, but by deep draining, steam ploughing, and by liquid manures conveyed through subterraneous pipes, he made his farm before sterile very fertile and profitable, and indeed one of the notable farms in England. He has been an alderman and sheriff of London, and was a commissioner to the Paris exhibition of 1855. He has published *Letters on Agricultural Improvements; Experiments in Drainage; How to Farm Profitably.*

MECHITARISTS, a congregation of Armenian Christians, who reside on the island of San Lazaro at Venice, but who have also obtained a footing in France, Austria, Turkey, Russia, etc. They derive their name from MECHITAR (i. e., the Comforter) DA PETRO (born 1676, died 1749), who, in 1701, founded at Constantinople a religious society for the purpose of diffusing a knowledge of the old Armenian language and literature. Subsequently, the Mechitarists removed to the Morea, and thence, on the conquest of that portion of Greece by the Turks in 1715, to San Lazaro, which was granted to them by the Venetian government.—The Mechitarists acknowledge the supremacy of the Roman pontiff. Their most useful occupation is printing the classic writings of Armenian literature; their additions are universally admitted to be the best and most correct. They also issue a *journal*, which is much read throughout the Levant.—Compare Boné, *Le convent de St. Lazare à Venise, ou Histoire succincte de l'Ordre des Méchitaristes Arméniens* (Paris, 1837).

MECH'LIN. See MALINES.

MECKEL'S GANGLION, or SPHENO-PALATINE GANGLION, the largest of the four sympathetic ganglia situated in the cephalic region, the others being the ophthalmic (q.v.), the otic (q.v.), and the sub-maxillary (q.v.). It lies in the spheno-maxillary fossa, close to the spheno-palatine foramen. It is triangular or heart-shaped, of a reddish gray color, and was first described by Meckel. It is connected with the superior maxillary nerve, which is a branch of the fifth cranial nerve (sensory), with the seventh cranial nerve, called the facial (motor), and with the carotid plexus (sympathetic) through the vidian nerve. Its branches are divided into four groups: 1. Ascending, passing to the orbit of the eye; 2. Descending, passing to the palate; 3. Internal, passing to the nose; 4. Posterior, passing to the pharynx.

MECKLENBURG, a co. in s.w. part of North Carolina, bordering at the s. on South Carolina, and w. on Catawba river; 650 sq.m.; pop. '70, 24,299, since considerably increased. The surface is hilly, and there are large forests, but a great part of the soil is productive—cotton, grass, and Indian corn being the staples. Granite and gold are found; the amount of the latter obtained in a year, according to the census of 1870, is over $60,000. At Charlotte, situated almost exactly in the center of the county, several important railroads form a junction. These are the Atlanta and Charlotte (part of the Piedmont air line), Charlotte, Columbia and Augusta, Atlantic, Tennessee and Ohio, and the North Carolina railroads. At the outbreak of the war of independence, the inhabitants of this region distinguished themselves for their ardent patriotism, and as being the

first community in the country formally to renounce allegiance to the British crown, which they did in May, 1775.

MECKLENBURG, a co. in s. central Virginia, bounded on the s. by North Carolina; drained by the Meherrin river, which forms its n. boundary, and also by the Roanoke; 650 sq.m.; pop. '80, 24,611. The surface is rolling and broken, but remarkably fertile. The chief products are tobacco, Indian corn, and wheat. Of tobacco there were over 2,000,000 lbs. raised in 1870. Granite quarries are found in the district. It is intersected by the Roanoke Valley railroad. Capital, Boydton.

MECKLENBURG DECLARATION OF INDEPENDENCE. This is a document sufficiently near in tenor to the declaration of the continental congress to warrant the people of North Carolina in claiming priority of action; but that action was by only one colony, indeed, by the citizens of one county—the other by all the colonies in perfect harmony. The statement generally accepted in the state is that at a public meeting in Charlotte, Mecklenburg co., held May 20, 1775, a series of resolutions was adopted, and a copy is produced. Other accounts date the meeting May 31. The tenor of the resolutions is in harmony with the declaration of July 4, 1776; but that must have been true of all public declarations of the people then in rebellion.

MECK'LENBURG-SCHWERIN, a grand duchy of northern Germany, bounded on the n. by the Baltic, e. by Pomerania, s. by Brandenburg, and w. by Lauenburg. The area is about 5,136 sq.m., and the pop. '75, 553,734. Mecklenburg-Schwerin is watered by several rivers, the most important of which are the Elbe and the Warnow, and has a great many lakes and ponds, yielding an abundant supply of fish. The country is generally flat, although here and there intersected by low ranges of hills, and its surface is still extensively covered with wood, notwithstanding the great clearings which have been made in the forests during the present century. Near the sea, tracts of sand and morass cover large areas; but on the whole the soil is of a good quality, and well adapted for the growth of corn or the rearing of cattle, which constitute the principal native industry. There is considerable commerce through Warnemünde (Rostock) and Wismar; there were in 1875, belonging to the two ports, 426 vessels, with a burden of 113,656 tons. The grand duchy is divided into the circles of Schwerin, Güstrow, Rostock, and Wismar. The capital is Schwerin. The central and s.e. districts are the most densely peopled. The people of both the Mecklenburg duchies (Schwerin and Strelitz) are for the most part of Slavonic origin, but amalgamation with their Saxon neighbors has largely Germanized the original race. The predominating form of religion is the Lutheran, Roman Catholic and other churches numbering about 1100, while there are upwards of 3,000 Jews. Much has been done of late years in extending the educational organization of both duchies, although the lower classes do not yet enjoy as many advantages as in some other districts of Germany. Besides the university at Rostock (q.v.), there are five gymnasia, and numerous burgher, parochial, and other schools. The troops of Mecklenburg-Schwerin number in time of peace 2,700 men, and when on a war-footing, 5,380 men. The principal towns are the capital Schwerin, Ludwigslust, Rostock, Güstrow, and Wismar. The grand duke, whose powers are limited by a mixed feudal and constitutional form of government, has the title of royal highness, and is styled prince of the Wends, and of Schwerin and Ratzeburg, count of Schwerin, and lord of Rostock, Stargard, etc. The two Mecklenburg duchies have provincial estates in common, which meet once a year, alternately at Malchin and Sternberg. This united chamber consists of 684 landowners and the representatives of 47 provincial boroughs, while the country people have no representation. There is no general budget for Mecklenburg-Schwerin.; there are three entirely distinct systems of finance. The budget of the first system, called the administration of the sovereign, is estimated at about 12,000,000 marks; the second, the states administration, has but small resources to dispose of: the ordinary budget of the common administration of the sovereign and the states was, for 1876–77, about 2,000,000 marks. The public debt is upwards of 43,000,000 marks. Mecklenburg-Schwerin has two votes in the federal council, and six representatives in the imperial diet.

History.—The Mecklenburg territory, anciently occupied by Germanic, and afterward by Slavonic tribes, was finally subdued, in the 12th c., by Henry the lion, duke of Saxony, who, after thoroughly devastating the country, and compelling the small number of inhabitants remaining after the war to adopt Christianity, restored the greater part of the territory to Burewin, the heir of the slain Slavonic prince Niklot, and gave him his daughter in marriage. The country at that period received its present designation from its principal settlement, Mikilinburg, now a village between Wismar and Bruël. In 1349 it was elevated into a duchy by the emperor Charles. Duke Johann Albrecht introduced the Protestant doctrines in 1550, and his grandsons, Wolf-Friedrich and Johann Albrecht, founded the lines of Mecklenburg-Schwerin and Mecklenburg-Güstrow, which were, however, deprived of the ducal title in 1627, in consequence of their adhesion to the Protestant cause, when the imperial gen. Wallenstein was proclaimed duke of all Mecklenburg. In 1632 Gustavus Adolphus of Sweden restored his kinsmen, the deposed dukes, to their domains. After various subdivisions of the ducal line into the branches of Schwerin, Strelitz, and others, and the successive extinction of several of these collateral houses, the imperial commission, which met at Hamburg in

1701, brought about the settlement of a family compact, by which it was arranged that Schwerin and Güstrow should form one duchy, and Strelitz, with Ratzeburg and Stargard, Mirow and Nemerow, another independent sovereignity. After this, very few events of importance occurred till the accession in Schwerin, in 1785, of Friedrich Franz, who obtained the title of grand duke in 1815, and died in 1837, after a long reign, which he had made highly conducive to the internal welfare and external reputation of his hereditary dominions. The reign of Friedrich Franz II., who succeeded his father, Paul Friedrich, in 1842, was disturbed by a contest between the nobles and the burgher and equestrian landowners, the former arrogating to themselves the exclusive right of electing members into the equestrian order, nominating to benefices, and monopolizing other prerogatives of the ancient feudal nobility. The revolutionary excitement of 1848 gave a fresh stimulus to the popular ferment, and the disturbances could only be quelled by the intervention of Prussian troops. Both as members of the north German confederation and of the empire, the two duchies have maintained their internal constitution very much on the old footing.

MECKLENBURG-STRELITZ, a grand duchy of Germany, composed of two distinct portions of territory, viz., Stargard (by far the larger division, lying to the e. of Mecklenburg-Schwerin) and the principality of Ratzeburg (between Mecklenburg-Schwerin and Lauenburg), and comprising an area of rather more than 1000 sq.m., with a pop. '75, of 95,673. The country is flat, and similar in its physical characters to Schwerin, although, from its greater distance from the sea, the climate is less humid and less changeable. Strelitz, as already observed, has one joint representative chamber with Schwerin, but the lordship of Ratzeburg is not included in these estates, and is governed directly by the grand duke, who possesses very considerable private domains, from which he draws large revenues. The grand duke gave Ratzeburg a representative constitution in 1869. Mecklenburg-Strelitz has one vote in the federal council of the empire, and one representative in the diet. Mecklenburg-Strelitz has a debt of nearly 2,000,000 thalers. For the history of Mecklenburg-Strelitz, see preceding article.

The Mecklenburg duchies are essentially agricultural, 71 per cent of the inhabitants being employed on the land. In Mecklenburg-Schwerin 3,549 sq.m., and in Mecklenburg-Strelitz 670 sq.m. are under cultivation. The cattle of the duchies are considered the best in Germany; the horses especially are held in high esteem. The principal products are corn (which is exported to Scandinavian and British ports), cattle and sheep (which are sent to the markets of Hamburg and Berlin), wool, tobacco, butter, cheese, fish, fruit, hides, etc. The matricular contribution of both duchies towards imperial expenditure amounted in 1876 to 890,560 marks, the share of Mecklenburg-Strelitz being 132,364.

MECON'IC ACID ($C_{14}HO_{10},3HO+6Aq$), (from Gr. *mēcōn*, a poppy), an acid existing in opium, which, when good, yields from 6 to 8 per cent. of it. Both the acid and its salts assume a characteristic blood-red tint with persalts of iron, and this test, which is very sensitive, is employed by the toxicologist in searching for traces of opium. As, however, the alkaline sulphocyanides which exist normally in the saliva give a precisely similar tint with the persalts of iron, it is necessary to be able to distinguish the meconate of iron from the sulphocyanide of iron. A solution of terchloride of gold or of corrosive sublimate removes all doubt, by discharging the color of the sulphocyanide, but not affecting the color of the meconate of iron.

MECO'NIUM. This term is applied to the earliest matter discharged from the bowels of a new-born infant. It is of a brownish-green or almost black color, acid to test-paper, but devoid of odor, and rapidly putrefying on exposure to air. It is usually regarded as a product of the fœtal liver, but, according to Lehmann, it contains neither biliary acids nor bile-pigment. When examined under the microscope, it is found to consist of an abundance of cylinder epithelium of a beautiful green tint, of mucus-corpuscles, and of fat, with which there is a good deal of cholesterine.

MECOS'TA, a co. in w. Michigan, intersected by the Grand Rapids and Indiana railroad, and a branch of the Chicago and West Michigan, terminating at Big Rapids; 576 sq.m.; pop. '80, 13,973—10,479 of American birth, 317 colored. It is drained by the Muskegon and Chippewa rivers. Its surface is generally level, and extensively covered with forests of oak and pine, furnishing good building timber, with groves of sugar maple. Its soil is fertile and well adapted to wheat, other kinds of grain, and dairy products. Some attention is paid to the raising of stock. The Muskegon river supplies extensive water-power, and its leading industries are the manufacture of lumber, shingles, furniture, etc. Co. seat, Big Rapids.

MEDAL (Fr. *médaille*, Lat. *metallum*), a piece of metal in the form of a coin, not issued or circulated as money, but stamped with a figure or device to preserve the portrait of some eminent person, or the memory of some illustrious action or event. The study of medals, interesting in an historical and antiquarian point of view, is also important as illustrating the contemporary state of art. Like coins, medals belong to two periods, ancient and modern, separated by a wide interval. To the former belong those pieces issuing from the mint of ancient Rome, known as *medallions*, of the size of the aureus in gold, of the denarius in silver, and of the first or large brass in copper. They are gener-

ally supposed to have been struck on occasions similar to those on which medals are coined in modern times, on the accession of an emperor, on the achievement of an important victory, or as specimens of workmanship; but there are circumstances which countenance the belief that they were circulated as money. Medallions prior to the time of Hadrian are rare and of great value; one of the most beautiful and most famous being a gold medallion of Augustus Cæsar; from Hadrian to the close of the empire they are comparatively common. Of the Roman medallions, some were struck by order of the emperors, some by the senate; the latter may be known by being inscribed with the letters S. C. The larger bronze medallions are of admirable workmanship. In some of them a ring of bronze surrounds a center of copper, and the inscription extends over both metals. No portrait of a person not princely occurs on any ancient medal, a remarkable circumstance, considering the numerous contemporary statues of poets, historians, and philosophers. The *contorniati* are bronze medals marked with furrows (*contorni*), distributed at the public games, and apparently also in use as money. Numerous medals and medallions were struck in the Greek provinces of the Roman empire, of less substance and thickness, for the most part, than those of Rome. The Sicilian medals are of very fine workmanship, particularly one with a head of Ceres, and on the reverse a Victory crowning a figure in a car.

Modern medals begin in the 14th c., but few were struck prior to the 15th. Portraits of non-princely persons are freely introduced after the 16th century. An affectation of the classical takes from their value as illustrations of contemporary life. Most European countries possess a succession of medals from the 15th c. onwards. The best in point of design of the 15th c. medals are those wrought by Victor Pisani of Verona, and inscribed "Opus Pisani Pictoris." The medals of the popes form an unbroken series from the time of Paul II., who filled the papal chair from 1464 to 1471. Those that purport to be of earlier popes are all known to be, in point of fact, of later date. The reverse generally bears the cross-keys and mitre, and the obverse the head of the reigning pope. Some of the medals of Julius II., Leo X., and Clement VII. have an especial value, as having been designed by Raphael and Giulio Romano, and engraved by Benvenuto Cellini. A 16th c. medal of Sicily is probably the first instance in modern times of the use of a medal as a vehicle of political satire; it is directed by Frederick II. against his adversary, Ferdinand of Spain, whose head is on the obverse, with the inscription, "Ferdinandus R. R. Vetus Vulpes Orbis;" and on the reverse a wolf carrying off a sheep, with "Jugum meum suave est et opus meum leve." Satirical medals were afterwards common in the Low Countries. A medal representing Van Heubingen, the Dutch ambassador, in the character of Joshua arresting the course of the sun, is said to have so exasperated Louis XIV., who was understood to be typified by that luminary, as to cause the whole hostile force of France to be brought against Holland. Some of the Dutch medals are noted for the elaborate views, maps, and plans engraved on them. France produced few medals prior to the time of Louis XIV.; but there is a series illustrative of the chief events in the life of the Grand Monarque, and another devoted to the career of the first Napoleon. The Spanish medals begin with Gonsalvo about 1500. Scotland produced one of the earliest of modern medals, struck by David II., perhaps during his captivity in England, and formed on the model of the nobles of Edward III. English medals only begin with Henry VIII., and from Edward VI. onward there is an unbroken succession of coronation medals. The Scottish gold coronation medal of Charles I. is the first medal struck in Britain with a legend on the edge. The medals of the commonwealth and Charles II. are by Simon; those of queen Anne record the achievements of Marlborough. Medals, in connection with numismatics (q.v.), are treated of by the various writers on that subject.

Medals in the present day are conferred by the sovereign as marks of distinction for eminent worth or noble conduct, more particularly for naval and military services. Such medals of honor are seldom of great intrinsic value, their worth depending merely on the associations connected with them. They have ribbons attached, with clasps or small bars, each of which bears the name of a particular action. The Waterloo medal is of silver, with the head of George IV. (Prince regent), a winged Victory, and the words "Waterloo," "Wellington;" it hangs from a crimson ribbon, with a narrow stripe of blue near each edge. The Crimean medal, also of silver, is attached to a blue ribbon with yellow edges when worn for service in the Crimea, and to a yellow ribbon with blue edges when for service in the Baltic. Good-service medals of silver were instituted in 1830 and 1831, and rules formed for their distribution among meritorious sailors, soldiers, and marines. The naval medal is worn suspended from a blue, and the military from a crimson ribbon. There are also various British medals which have been conferred for services in the Peninsula, India, etc. On every medal is engraved the name, rank, etc., regiment or ship of the recipient of it. Medals and decorations do not seem to have been ever conferred as rewards in the army or navy prior to the commonwealth. The French military medal and the Sardinian war-medal were some time ago bestowed to a large extent on British officers, soldiers, seamen, and marines. The former exhibits the effigy of Napoleon III., surmounted by an eagle, and is worn from a yellow ribbon with green borders; the latter is charged with the cross of Savoy, and suspended from a sky-blue ribbon. No medal of honor from any foreign sovereign is allowed to be worn or accepted by any British subject without the sanction of the queen.

MEDALLION (in architecture), a circular panel containing a bas-relief of a head, bust, figure, etc.

MEDARY, SAMUEL, 1801–64; b. Penn.; received only a common-school education, and became a printer. He entered into politics, and sustained gen. Jackson; and for many years edited the *Ohio Statesman*. From 1857 to 1860, he was governor of the territories of Minnesota and Kansas, in each case for two years. He had previously been offered the position of minister to Chili, which he refused. He established the *Columbus Crisis*, at Columbus, O., and continued to conduct and edit it until his death. In 1869 his many personal and political friends erected a costly and beautiful monument to his memory.

MEDE, or MEADE, JOSEPH, 1586–1638; b. Berden, Essex, Eng. While a boy at school at Wetherfield he accidentally, on a visit to London, picked up a copy of Bellarmine's Hebrew grammar, and soon acquired a good knowledge of the language. He graduated at Christ church, Cambridge, in 1610. His learning at this time is spoken of as extraordinary. His first work was *De Sanctitate Relativa*, addressed to bishop Andrews who requested him to become his domestic chaplain. Declining this he was soon afterward made a fellow of his college, and reader of the Greek lectures on Sir Walter Mildmay's foundation, which office he occupied till his death. In 1618 he took his degree of B.D. The provostship of Trinity college, Dublin, offered him twice, in 1627 and 1630, through the influence of archbishop Usher, he declined, preferring the retirement of college for study. He was distinguished for meekness, modesty, and liberality, devoting the tenth of his small income to charitable and pious purposes. His learning was various and profound. He was well acquainted with mathematics, medicine, the various branches of natural science, history, antiquities, and the literature and sciences of the East. His chief work was *Clavis Apocalyptica*, translated into English in 1643, the first rational attempt, according to bishop Hurd, to interpret the apocalypse. His complete works were collected after his death in one folio volume by Dr. Worthington, with a life of the author.

MEDE'A, in Grecian legend, a famous sorceress, the daughter of Aëtes, king of Colchis, and of the Oceanid Idyia, or of Hecate. She married Jason, the leader of the Argonauts (q.v.), and aided him in obtaining the Golden fleece. Jason, after his return home, being desirous to be revenged on Pelias for the murder of his parents and his brother, Medéa persuaded the daughter of Pelias to cut him in pieces and boil him, in order to make him young again. Jason and she fled to Corinth, where, after she had been his wife for ten years, he repudiated her, to marry Glauce or Creusa, and Medéa, in revenge, sent by her son to her rival a poisoned robe or diadem, the virulence of which destroyed both her and her father. Medéa then slew the children which she had borne to Jason, and fled to Athens in a chariot drawn by dragons, which she obtained from Helios. There she was received by Ægeus, to whom she bore Medos; but afterwards being compelled to flee from Athens, she took Medos to Aria, the inhabitants of which were thenceforth called Medes. She finally became immortal, and the spouse of Achilles in the Elysian fields. Such is the classic legend, which afforded material for many productions of the tragic muse, and subjects for the painter and sculptor, and which even in modern times has been so employed.

MEDE'AH, a t. of Algeria, 43 m. s.s.w. of the town of Algiers, consists of a walled town and suburbs. It is considered as, on the whole, one of the finest towns in Algeria. There is an Arab market held every Friday. Under the Romans, Medéah was a military station. Pop. within the walls, 2,100; without the walls, 5,700; total, 7,800.

MEDELLIN, a city of the United States of Colombia, South America, in the province of Antioquia, and 50 m., s.e. of the city of that name, between the ranges of the central and western Cordilleras. It is a beautiful town, and, placed at an elevation of about 5,000 ft. above sea-level; its climate is exceedingly pleasant. It is the entrepot of trade for the surrounding district, and contains a pop. estimated at 15,000.

MEDEOLA. See INDIAN CUCUMBER.

MEDFORD, a t. in Massachusetts, on the Mystic river at the head of navigation and near the Mystic pond, which forms a part of its boundary and supplies water to certain sections of Boston; pop. '80, 7,573. It is 4 m., n.w. of Boston, on the Boston and Maine, and Boston, Lowell, and Nashua railroads, and is the seat of Tufts college (Universalist). It has a public library, a savings bank, 2 newspapers, a reading room; excellent public schools, 7 churches, and a town house. It has many beautiful residences occupied by men of business in the city of Boston, and has delightful drives and lovely scenery. The celebrated Medford rum is manufactured here, and it has manufactories of tin ware, harness, leather, crackers, woolen goods, cotton cloths, buttons, carpets, oil silk, boots and shoes, and bricks. In former times it numbered ship-building among its industries.

MEDHURST, WALTER HENRY, an English missionary; 1796–1857; b. London; educated for the ministry, and, by appointment of the London missionary society in 1816, labored successfully in India, Malacca, and other Asiatic countries, and afterwards settled in Batavia, Java, where he remained eight years, performing missionary work also in Borneo. In 1845 he was sent to China, and settled at Shanghai. He had charge of the printing establishment, which before this had been worked at Batavia, but he now

removed it to Shanghai, and began to print sermons and tracts. For six years he performed mission work in the interior of China amid much peril. He was much opposed by the Romanists in the year 1847, yet 34,000 copies of various works were printed, and 500 tracts were weekly distributed. During this year delegates from several stations convened in Shanghai for the revision of the New Testament. In this work he was engaged till 1850, when he devoted his time to the Old Testament. In 1856 he returned to England in impaired health, and died three days after his arrival. He was a faithful missionary, and a distinguished oriental scholar. He was well versed in the Chinese, Japanese, Javanese, and other languages, besides Dutch and French, in all of which he wrote. His special works are: *China, its State and Prospects, with Especial Reference to the Diffusion of the Gospel; Dissertation on the Theology of the Chinese; The Chinese Version of the Scriptures; A Chinese Dictionary; A Japanese and English Vocabulary; Dictionary of the Hokkien Dialect; Translation of a Comparative Vocabulary of the Languages of China, Corea, and Japan; Notes on Chinese Grammar*; *Chinese Dialogues.* He was engaged also on the following works: *Chinese Repository*, 20 vols.; *Chinese Miscellanies*, 3 vols. He published also an *Account of the Malayan Archipelago*, and *A Glance at the Interior of China.*

ME'DIA, in ancient times, the name of the north-western part of Iran, which was bounded by the Caspian sea on the n., by Persia on the s., by Parthia on the e., and by Assyria on the west. The northern portion of the country is very mountainous; the s. is a rich and fertile tract. Media at present forms the Persian provinces of Azerbijan, Ghilan, Mazanderan, and Irak-Ajemi, and the northern portion of Luristan. The Medians were in language, religion, and manners very nearly allied to the Persians. After they had shaken off the yoke of the Assyrians, their tribes united about 708 B.C., according to the common account, chose Dejoces (Kai-Kobad) for their chief, and made Ecbatana their capital. His son Phraortes, or Arphaxad, subdued the Persians. Cyaxares (Kai-Kaous), the son of Phraortes, in alliance with Nabopolassar, king of Babylon, overthrew the Assyrian empire about 604 B.C., spread the terror of his arms as far as Egypt and the furthest bounds of Asia Minor, and vanquished the brigand hordes of Scythia, who had carried their ravages as far as Syria. He was succeeded by his son Astyage (Asdehak), who was deposed (560 B.C.) by his own grandson Cyrus (Kai-Khûsru), king of Persia; and from this time the two nations are spoken of as one people. Ecbatana, the capital of Medea, became the summer residence of the Persian kings. After the death of Alexander the great (324 B.C.), the N.W. portion (*Atropatene*) of Medea became a separate kingdom, and existed till the time of Augustus; the other portion, under the name of *Great Media*, forming a part of the Syrian monarchy. Medea was on several occasions separated from Persia. In 152 B.C. Mithridates I. took Great Media from the Syrians, and annexed it to the Parthian empire, and about 36 B.C. it had a king of its own, named Artavasdes, against whom Mark Antony made war. Under the Sassanian dynasty the whole of Media was united to Persia. It became, during the 14th and 15th centuries, the stronghold of the Turcoman tribes Kara-Koinlû, or "Black Sheep," and Ak-Koinlû, or "White Sheep."

In early times the Medes were a warlike race, possessed of an enthusiastic love of independence, and distinguished for their skill with the bow. They were also celebrated for their horsemanship, and it was from them that the Persians adopted this and other favorite exercises and acquirements. In subsequent times they appear to have become effeminated by luxury. (See the works of Xenophon, Strabo, and Ammianus.)

ME'DIATE, in the old German empire, a term applied to those lordships or possessions which were held by feudal tenure under one of the greater vassals, and so only *mediately* under the emperor as the supreme feudal lord. Many of the smaller states or lordships were gradually reduced to this condition as the neighboring greater states increased in power; and amidst the changes caused by the wars of the French revolution in 1803 and 1806, many small states were thus *mediatized*, in which the greater states found a sort of compensation for their losses in other quarters. The term continued to be employed even when the feudal sovereignty of the German empire did not exist. At the congress of Vienna, further mediatizations were effected; and at the present day the people of many of the smaller existing states are anxious for a similar change. The question of mediatization was one of those affecting the internal welfare of Germany which were most keenly agitated in 1848.

MEDIATOR, a term applicable to any person who endeavors to reconcile parties at variance. In theology it is employed to denote Jesus Christ, both with respect to his sacrifice of *atonement* (q.v.)—making God and man *as one* again, by satisfying divine justice, which otherwise demands the punishment of sinners—and with respect to his continual intercession (q.v.). The Roman Catholic church represents *saints* as mediators of intercession, although not of atonement; but this view is rejected by Protestants.

MEDICAL DEPARTMENT of an army, next to the commissariat, is the most important of all the non-combatant sections. The surgical treatment of the wounded in actual fighting, and still more the combat with disease engendered by crowding, unhealthy stations, and the reckless habits of the soldiery, necessitate a large medical staff; for, on an average of the whole army, it is found that the rate of sickness is at least triple that for the civil population.

In the British army every battalion, when at home or in the temperate zone, has a surgeon and an assistant-surgeon; when in India or the tropics, another assistant-surgeon is added. In addition to these officers, there are numerous staff medical officers at all stations, who have charge of detachments, hospitals, etc. The active list of the medical officers comprised, in 1879–80, 530 surgeons-general, deputy surgeons-general, surgeons-major, and surgeons. Besides these, there are between 400 and 500 medical officers employed with the army in India. The total estimate for medical establishments and services in 1879–80 was £266,200.

The medical department is governed by a director-general, who is a member of the war office, and has charge of the surgical, medical, and sanitary arrangements of the army. The special duties, pay, etc., of the several ranks will be found under SURGEON.

MEDICAL DEPARTMENT, in the navy, is only of less importance than the same department in the army, in that the sea-service is vastly more healthy than service upon land. After an action, the surgeon, of course, is in equal requisition in either case. In the British navy, the medical officers in active employ, in 1876, comprised 5 inspectors-general, 12 deputy inspectors-general, 81 fleet surgeons, 123 staff surgeons, and 195 surgeons. The pay of these officers ranges from £2 10s. a day for a senior inspector-general of hospitals and fleets, to 11s. a day for a junior surgeon.

MEDICAL DEPARTMENT IN THE U.S. ARMY AND NAVY. See UNITED STATES ARMY; UNITED STATES NAVY.

MEDICAL JURISPRUDENCE. See JURISPRUDENCE, MEDICAL.

MEDICAL PRACTITIONERS, in point of law, have lately been put on a new footing in many respects. The late statute (21 and 22 Vict. c. 90), and later ones, gave the body of medical practitioners powers of self-government, so far as regards qualification and training. All duly qualified persons are now registered, and the register is published, though it is not in strict law compulsory on practitioners to register themselves, the only disadvantage being that those who are not registered cannot fill certain offices, and cannot sue for their fees. Before the late acts, physicians were on the same footing as barristers, and could not sue for their fees, these being considered an honorarium which ought to be paid beforehand, and, at all events, were not a legal debt. But the act remedies this defect as regards qualified registered practitioners. Another enactment of the recent statute, which was intended to put down quacks, but which is still found to be capable of evasion to some extent, was the giving of power to justices of the peace to punish with fine of £20 or imprisonment those who falsely pretend to be, or take, or use the name or title of a physician, doctor of medicine, licentiate in medicine or surgery, bachelor of medicine, surgeon, general practitioner or apothecary.

MEDICAL SCHOOL, NETLEY, an establishment for the technical education of medical officers for the British and Indian military service. Candidates are examined competitively in the ordinary subjects of professional knowledge; and, passing satisfactorily through that ordeal, are then required to attend, for six months, at the Military Medical school, where they go through practical courses of military hygiene, military and clinical-military surgery and medicine, and pathology with morbid anatomy. As the school is attached to the Royal Victoria hospital, which is the great invalid depot for the whole army, the students have ample opportunity of seeing theory exemplified in practice. The school comprises 4 professors with £850 a year each, 4 assistant-professors having £450 each, and usually about 40 medical candidates, who receive each 5s. a day and lodging-money. The annual cost of the whole establishment is about £7,900. See NETLEY.

MED'ICI, THE, who ranked among the first and most distinguished families of the Florentine republic, owe their earliest distinction to the success with which they had pursued various branches of commerce, and the liberal spirit in which they devoted their wealth to purposes of general utility. From the beginning of the 13th c., the Medici took part in all the leading events of the republic; and from the period when Salvestro de' Medici attained the rank of gonfaloniere in 1378, the family rose rapidly to pre-eminence, although the almost regal greatness which it enjoyed for several centuries is more especially due to Giovanni de' Medici, who died in 1429, leaving to his sons, Cosmo and Lorenzo, a heritage of wealth and honors hitherto unparalleled in the republic. With Cosmo (born 1389, died 1464), on whom was gratefully bestowed the honored title of "Father of his country," began the glorious epoch of the Medici; while from Lorenzo is descended the collateral branch of the family, which, in the 16th c., obtained absolute rule over Tuscany. Cosmo's life, except during a short period, when the Albizzi and other rival families re-established a successful opposition against the policy and credit of the Medici, was one uninterrupted course of prosperity; at once a munificent patron and a successful cultivator of art and literature, he did more than any sovereign in Europe to revive the study of the ancient classics, and to foster a taste for mental culture. He assembled around him learned men of every nation, and gave liberal support to numerous Greek scholars, whom the subjection of Constantinople by the Turks had driven into exile; and by his foundation of an academy for the study of the philosophy of Plato, and of a library of Greek, Latin, and Oriental MSS., he inaugurated a new era in modern learning and art. But although these merits must be conceded to him, it must not be

forgotten that while he retained the name of a republican form of government, and nominally confided the executive authority to a gonfaloniere and eight priori or senators, he totally extinguished the freedom of Florence. His grandson, Lorenzo the Magnificent (born Jan. 1, 1448, died April 8, 1492), who succeeded to undivided and absolute power in the state, after the murder of his brother Giuliano in 1478, pursued, with signal success, the policy of his family, which may be characterized as tending to ennoble individuals and debase the nation at large. He encouraged literature and the arts; employed learned men to collect choice books and antiquities for him from every part of the known world, established printing-presses in his dominions as soon as the art was invented, founded academies for the study of classical learning, and filled his gardens with collections of the remains of ancient art; but when his munificence and conciliatory manners had gained for him the affection of the higher and the devotion of the lower classes, he lost no time in breaking down the forms of constitutional independence that he and his predecessors had hitherto suffered to exist. Some few Florentines, alarmed at the progress of the voluptuous refinement which was smothering every spark of personal independence, tried to stem the current of corruption by an ascetic severity of morals, which gained for them the name of *piagnoni*, or weepers. Foremost among them was the Dominican friar Girolamo Savonarola (q.v.), whose eloquent appeals to the people in favor of a popular and democratic form of government, threatened for a time the overthrow of the Medici; but the jealousy of the Franciscans, and the vindictiveness of the papal court, averted their doom. Savonarola's martyrdom restored outward tranquillity to Florence, and left the Medici in undisturbed possession of absolute power. Pietro (born 1471), who succeeded his father Lorenzo in 1492, possessed neither capacity nor prudence; and in the troubles which the ambition of her princes and the profligacy of her popes brought upon Italy, by plunging her into civil and foreign war, he showed himself treacherous and vacillating alike to friends and foes. Lodovico Sforza, surnamed the "Moor," relying on the friendship which, from the middle of the 15th c., had prevailed between the Sforza family of Milan and the Medici, applied to him for assistance in establishing his claim to the duchy of Milan; but seeing that no reliance could be placed on Pietro, he threw himself into the arms of Charles VIII. of France. The result was the invasion of Italy by a French army of 32,000 men. Pietro, in hopes of conciliating the powerful invader, hastened to meet the troops on their entrance into the dominions of Florence, and surrendered to Charles the fortresses of Leghorn and Pisa, which constituted the keys of the republic. The magistrates and people, incensed at his perfidy, drove him from the city, and formally deposed the family of the Medici from all participation in power. Pietro, who was slain in 1503, while fighting in the French ranks, and several of his kinsmen, made ineffectual attempts to recover their dominions, which were not restored till 1512. The elevation of Giovanni de' Medici to the papal chair, under the title of Leo X., completed the restoration of the family to their former splendor, while the accession in 1523, of his cousin Giulio Medici to the pontificate as Clement VII., and the marriage of Catharine, the granddaughter of Pietro, to Henry II. of France, and her long rule over that country as regent for her sons, together with the military power of the cadet branch (descended from a younger brother of the "Father of his country"), threw a weight of power into the hands of the Medici, which rendered all attempts to maintain even a show of independence futile on the part of the Florentines. The faintest indication of republican spirit was at once crushed by the combined aid of the pope and Charles V.; and though the legitimate male line of Cosmo was extinct (with the exception of pope Clement VII.), the latter gave in 1529, to Alessandro, natural son of the last prince Lorenzo II., the rank of duke of Florence; and on his death, by assassination, without direct heirs, in 1537, raised Cosmo I., the descendant of a collateral branch, to the ducal chair. Cosmo, known as the great, possessed the astuteness of character, the love of elegance, and taste for literature, but not the frank and generous spirit that had distinguished his great ancestors; and while he founded the academies of painting and of fine arts, made collections of paintings and statuary, published magnificent editions of his own works and those of others, and encouraged trade, for the protection of which he instituted the ecclesiastical order of St. Stephen, he was implacable in his enmity, and scrupled not utterly to extirpate the race of the Strozzi, the hereditary foes of his house. His acquisition of Sienna gained for him the title of grand duke of Tuscany from Pius V.; and he died in 1574, leaving enormous wealth and regal power to his descendants, who, throughout the next half century, maintained the literary and artistic fame of their family. In the 17th c., the race rapidly degenerated; and after several of its representatives had suffered themselves to be made the mere tools of Spanish and Austrian ambition, the last male representative of the line, Giovanni Gaston, died in 1737, and his only sister the Electress Palatine, the last of the Medici family, expired in 1743. In accordance with a stipulation of the peace of Vienna, the grand duchy of Tuscany passed to the house of Lorraine.

MEDICI, CATHARINE DE'. See CATHARINE DE' MEDICI, *ante*.

MEDICI, MARIE DE'. See MARIE DE' MEDICI, *ante*.

MEDICI'NA, a t. of Italy, in the province of Bologna, 13 m. e. of the city of that name. Pop. 4,000. It is a thriving place, with considerable trade and large markets.

It has five churches and a theater, and is surrounded by walls. It occupies the site of the ancient city *Claterna*, of which some remains are still visible.

MEDICINAL PLANTS. Those plants of which some part or product is used in medicine, are very numerous, and belong to the most widely different orders. In some orders, particular properties are prevalent; other medicinal species are exceptional as to their properties in the orders to which they belong. Important properties and products are sometimes characteristic of a particular very limited group of species, as in the case of the *cinchonas*. Many medicinal plants are merely used by the people of the countries in which they grow, others—known as *officinal plants*—have a place accorded them in pharmacopœias and in the practice of educated medical practitioners. Many plants, however, are in high repute among the native physicians of India, which have not yet found a place in any western pharmacopœia, although a few of the most valuable have recently been introduced to notice in Europe. Of the plants which have been rejected from the pharmacopœias, but retain their place in rustic practice, some are really useful, and would be held in greater esteem if there were not preferable medicines of similar quality; others have owed their reputation merely to ridiculous fancies. Some medicinal plants are always gathered where they grow wild, others are cultivated in order to have them in sufficient abundance. This branch of gardening is carried on to a greater extent at Mitcham, near London, than in any other part of Britain. A great boon has very recently been conferred on mankind—so recently that it has scarcely yet begun to be enjoyed—in the introduction of *cinchona* (q.v.) trees into India, Ceylon, and Java, where their cultivation has been commenced with every prospect of success, a continued supply of Peruvian bark and of quinine, their increased abundance, and a diminution of their price, being thus secured.

Among the most valuable books on medicinal plants are Hayne's *Getreue Darstellung und Beschreibung der in Arzeneikunde gebräuchlichen Gewächse* (4 vols. Berlin, 1805–46); Nees von Esenbeck, Weihe, Walter, und Funke, *Vollständige Sammlung officineller Pflanzen* (3 vols. Düsseldorf, 1821–33).—Pereira's *Materia Medica* is also of very high excellence.

MEDICINE, History of. There is reason to believe that Egypt was the country in which the art of medicine, as well as the other arts of civilized life, was first cultivated with any degree of success, the offices of the priest and the physician being probably combined in the same person. In the writings of Moses there are various allusions to the practice of medicine amongst the Jews, especially with reference to the treatment of leprosy. The priests were the physicians, and their treatment mainly aimed at promoting cleanliness and preventing contagion. Chiron (q.v.), the centaur, is said to have introduced the art of medicine amongst the Greeks; but the early history of the art is entirely legendary. See Æsculapius.

With a passing allusion to the names of Pythagoras, Democritus, and Heraclitus, who in their various departments may be regarded as having advanced the art of medicine, we arrive at the time of Hippocrates (q.v.). The advance which Hippocrates made in the practice of medicine was so great, that no attempts were made for some centuries to improve upon his views and precepts. His sons, Thessalus and Draco, and his son-in-law, Polybius, are regarded as the founders of the medical sect which was called the Hippocratean or dogmatic school, "because it professed to set out with certain theoretical principles which were derived from the generalization of facts and observations, and to make these principles the basis of practice."

The next circumstance requiring notice in the history of medicine is the establishment of the school of Alexandria, which was effected by the munificence of the Ptolemies, about 300 years before the Christian era. Amongst the most famous of its medical professors are Erasistratus and Herophilus. The former was the pupil of Chrysippus, and probably imbibed from his master his prejudice against bleeding, and against the use of active remedies, preferring to trust mainly to diet and to the *vis medicatrix naturæ*. It was about this time that the empirics formed themselves into a distinct sect, and became the declared opponents of the dogmatists. The controversy, says Bostock, in his *History of Medicine*, really consisted in the question—how far we are to suffer theory to influence our practice. While the dogmatists, or, as they were sometimes styled, the rationalists, asserted, that before attempting to treat any disease, we ought to make ourselves fully acquainted with the nature and functions of the body generally, with the operation of medical agents upon it, and with the changes which it undergoes when under the operation of any morbid cause; the empirics, on the contrary, contended that this knowledge is impossible to be obtained, and, if possible, is not necessary; that our sole guide must be experience, and that if we step beyond this, either as learned from our own observation, or that of others on whose testimony we can rely, we are always liable to fall into dangerous and often fatal errors. According to Celsus, who has given an excellent account of the leading opinions of both sects, the founder of the empirics was Serapion of Alexandria, who was said to be a pupil of Herophilus. At this period, and for some centuries subsequent to it, all physicians were included in one or other of these rival sects, and, apparently, the numbers of the two schools were about equal.

We learn from Pliny that medicine was introduced into Rome at a later period than the other arts and sciences. The first person who seems to have made it a distinct pro-

fession was Archagathus, a Peloponnesian, who settled at Rome about 200 B.C. His treatment was so severe and unsuccessful that he was finally banished; and we hear of no other Roman physician for about a century, when Asclepiades, of Bithynia, acquired a great reputation. His popularity depended upon his allowing his patients the liberal use of wine and of their favorite dishes, and in all respects consulting their inclinations and flattering their prejudices; and hence it it is easy to understand the eminence at which he arrived. He was succeeded by his pupil Themison of Laodicea, the founder of a sect called Methodics, who adopted a middle course between the dogmatists and empirics. During the greater part of the first two centuries of our era the Methodics were the prepondering medical sect, and they included in their ranks C. Aurelianus, some of whose writings have come down to us. They then broke up into various sects, of which the chief were the Pneumatics, represented by Aretæus of Cappadocia, whose works are still extant; and the Eclectics, of whom Archigenes of Apamea was the most celebrated. But the most remarkable writer of this age is Celsus (q.v.), whose work *De Medicina* gives a sketch of the history of medicine up to his time, and the state in which it then existed. He is remarkable as being the first native Roman physician whose name has been transmitted to us. The names of Andromachus, the inventor of the theriaca, a preparation which was retained in our pharmacopœias until the close of the last century—of Pliny the naturalist—and of Dioscorides, cannot be altogether omitted in even the briefest sketch of the early history of medicine; but their contributions to its progress dwarf into insignificance when compared with those of Galen (q.v.), whose writings were universally acknowledged as ultimate authority until they were attacked and publicly burned in the 16th c. by the arch-quack, Paracelsus (q.v.). A learned and impartial critic, the late Dr. Aikin, after giving full credit to Galen for talent and acquirements, thus concludes: "His own mass and modern improvements have now in a great measure consigned his writings to neglect, but his fame can only perish with the science itself." As in the case of Hippocrates, his immeasurable superiority over his contemporaries seems to have acted as a check to all attempts at further improvement.

The first names of any renown that occur subsequently to the death of Galen (about 193 A.D.) are those of Oribasius, Alexander of Tralles, Ætius, and Paulus Ægineta, who flourished between the 4th and 7th centuries. They were all zealous Galenists, and those of their writings which are extant are for the most part compilations from their predecessors, and especially from their great master. With the death of Paulus the Greek school of medicine may be considered to have come to an end, for after his time no works of any merit were written in this language. The Arabian school was now beginning to rise into notice. The earliest Arabic writer on medicine of whom we have any certain account is Ahrum, who was contemporary with Paulus. The most celebrated physicians of this school were Rhazes (who flourished in the 9th c., and was the first to describe the small-pox), Avicenna (q.v.), (who flourished in the 11th c., and whose *Canon Medicinæ* may be regarded as a cyclopædia of all that was then known of medicine and the collateral sciences), Aulbucasis (whose works on the practice of surgery were for several ages regarded as standard authorities), Avenzoar, and Averrhoes (q.v.), (who flourished in the 12th c., and was equally celebrated as a physician and a philosopher). The works of Hippocrates and Galen, which, together with those of Aristotle, Plato, and Euclid, were translated into Arabic in the 9th c., formed the basis of their medical knowledge; but the Arabian physicians did good service to medicine in introducing new articles from the east into the European materia medica—as, for example, rhubarb, cassia, senna, camphor—and in making known what may be termed the first elements of pharmaceutical chemistry, such as a knowledge of distillation, and of the means of obtaining various metallic oxides and salts.

Upon the decline of the Saracenic universities of Spain, which may date from the death of Averrhoes, the only medical knowledge which remained was to be found in Italy, where the school of Salerno acquired a considerable celebrity, which it maintained for some time, till it was gradually eclipsed by the rising fame of other medical schools at Bologna—where Mondini publicly dissected two human bodies in 1315—Vienna, Paris, Padua, etc. Contemporary with Mondini lived Gilbert, the first English writer on medicine who acquired any repute; and the next century gave birth to Linacre, who, after studying at Oxford, spent a considerable time at Bologna, Florence, Rome, Venice, and Padua, and subsequently became the founder of the London college of physicians. It was in this (the 15th) c. that the sect of chemical physicians arose, who maintained that all the phenomena of the living body may be explained by the same chemical laws as those which rule inorganic matter. Although the illustrations and proofs which they adduced were completely unsatisfactory, a distinguished physiological school of the present day is merging into a very similar view, with, however, far more cogent arguments in its support. The chemists of that age, with Paracelsus at their head, did nothing to advance medicine, except to introduce into the materia medica several valuable metallic preparations.

This period seems to have been prolific in originating new diseases. It is in the 13th, 14th, and 15th centuries that we hear most of leprosy and of the visitations of the plague in Europe. Until the 15th c. whooping-cough and scurvy were unknown, or, at all events, not accurately described; and it was towards the close of that century that syphilis was first recognized in Italy (from which country it rapidly extended over the

whole of Europe), and that the sweating sickness (*sudor anglicanus*) made its first appearance in this country.

In the 16th c., the study of human anatomy may be said to have been first fairly established by the zeal and labors of Vesalius (q.v.); and in this and the succeeding century we meet with the names of many physicians whose anatomical and physiological investigations materially tended, either directly or indirectly, to advance the science of medicine. This was the epoch of Eustachius, Fallopius, Asellius, Harvey, Rudbeck, Bartholin, Malpighi, Glisson, Sylvius, Willis, Bellini, etc. Chemistry was now separating itself from alchemy, and was advancing into the state of a science, and a combination was now formed between its principles and those of physiology, which gave rise to a new sect of chemical physicians, quite distinct from the sect represented two centuries previously by Paracelsus. They considered that diseases were referrible to certain fermentations which took place in the blood, and that certain *humors* were naturally acid, and others naturally alkaline, and according as one or other of these predominated, so certain specific diseases were the result, which were to be removed by the exhibition of remedies of an opposite nature to that of the disease. They were soon succeeded by the mathematical physicians, or the Iatro-mathematical school, of which Borelli, Sauvages, Keill, Jurin, Mead, and Friend were among the most celebrated. In proportion as this sect gained ground that of the chemists declined, while the old Galenists were fast disappearing. To these rival sects must be added that of the Vitalists, which originated with Van Helmont (q.v.), and which, with some modifications, was adopted by Stahl and Hoffmann. The greatest physician of the 17th c. was, however, unquestionably Sydenham (q.v.), who, though inclining toward the chemical school, did not allow his speculative opinions regarding the nature of disease to interfere with his treatment.

The most eminent teacher of medicine in the early part of the 18th c. was Boerhaave, who was elected to the chair of medicine at Leyden in 1709. Among the pupils of Boerhaave must be especially mentioned Van Swieten, whose commentaries on the aphorisms of his master contain a large and valuable collection of practical observations; and Haller (q.v.), the father of modern physiology; while amongst the most celebrated opponents of the Hallerian theory, that irritability and sensibility are specific properties of the muscular and nervous systems, must be mentioned Whytt and Porterfield, physicians of high reputation in Edinburgh, and the former professor of medicine in the university.

In the article upon Cullen (q.v.), so full an account is given of the doctrines of that celebrated physician that it is unneccessary to add more than that most of the distinguished physicians of the latter part of the 18th c. belonged to what may be termed the Cullenian school of medicine. His views were attacked with great acrimony by his former assistant, John Brown, the founder of the Brunonian system of medicine. In this country the views of Brown were regarded as too purely theoretical, and did not acquire any great popularity; but on some parts of the continent, and especially in Italy, they were very generally adopted, and became for a considerable time the prevailing doctrine in several of the leading medical schools. To supplement this meager outline of the progress of medicine in the 18th c., the reader is recommended to consult the biographical sketches of Monro, Blane, the Hunters, Jenner, etc.

If we exclude certain popular quackeries, we may regard the Brunonian as the last of medical sects. The present century may be considered as the epoch of physiological experiment and clinical observation. The efficient laborers in the field of medicine, during the last 60 years, have been so numerous that it would be impossible to notice, in this article, even those whom we deemed the most celebrated, while it would be invidious to attempt such a selection.

Our materia medica has received a large number of most important additions, among which may be especially noticed quinine, morphia, strychnine, iodine, and the iodides, the bromides, hydrocyanic acid, cod-liver oil, and chloroform. The physical diagnosis of disease has been facilitated to an extent far beyond what the most sanguine physician of the last century could have deemed possible, by the discovery and practical application of the stethoscope, the pleximeter, the speculum, the ophthalmoscope, and the laryngoscope; while chemistry and the microscope have been successfully applied to the investigation of the various excretions, and especially of the urine and its deposits.

The discovery of vaccination as a means of preventing small-pox, although made (see JENNER) at the close of last century, may be regarded practically as belonging to the present, since a considerable time elapsed before its value was generally recognized.

The true and certain diagnosis between typhus and typhoid (or enteric) fever is due to living physicians; and the discoverers of Bright's disease of the kidneys, and of Addison's disease of the supra-renal capsules, have only recently been lost to science.

The treatment of many diseases, especially those of an inflammatory nature, has been much modified, and in most cases improved, especially during the last quarter of a century. The victims to the lancet are far fewer than they formerly were, but if the patients of the present day run little risk of being bled to death, there is an occasional chance of their perishing from the too copious administration of brandy. The moral to be drawn by the unbiased observer of the depleting and the stimulating modes of treating inflammatory diseases such as pneumonia and pericarditis, is that nature will often effect a cure even in spite of the interference of too energetic physicians. It is estab-

lished beyond all question by the statistics which have been collected by an eminent living physician, that the progress of pulmonary consumption is retarded for an average space of three years by the judicious administration of cod-liver oil; due attention being, of course, paid to the general treatment of the patient.

MEDICK, *Medicago*, a genus of plants of the natural order *leguminosæ*, sub-order *papilionaceæ*, nearly allied to clover (q.v., *trifolium*), but distinguished from that and other kindred genera by the sickle-shaped, or, in most species, spirally twisted legume. The species, which are very numerous, are mostly annual and perennial herbaceous plants, with leaves of three leaflets like those of clover, natives of temperate and warm climates. A number of them are found in Britain, and many more in the south of Europe. They generally afford good green food for cattle, and some of them are cultivated like the clovers for this use, amongst which the most important is the PURPLE MEDICK or lucern (q.v., *M. sativa*). Besides this, the BLACK MEDICK, NONSUCH, or LUPULINE (*M. lupulina*), is one of the most generally cultivated. It receives the name black medick from the black color of the ripe pods, which are short, black, twisted, and arranged in oblong heads, and is often called yellow lucern, or yellow clover, from the color of its flowers. It is a common native of Britain. In habit and general appearance it is very similar to *trifolium procumbens*, or *T. filiforme*. In British husbandry it is now very generally sown in mixture with red clover and rye-grass, and is useful where a close turf is desired.

MEDIETA'TE LIN'GUÆ, JURY DE. See JURY.

MEDILL, JOSEPH, b. New Brunswick, 1823; while still quite young, removed to Massillon, O., studied law, and began his experience as a journalist in 1849, when he established a free-soil paper at Coshocton, O. In 1852 he was in Cleveland, where he founded the *Forest City*, a whig paper; and in 1854 was among those who organized the new republican party in Ohio. In 1855, in company with two partners, he bought the Chicago *Tribune;* and in 1874, after his return from a tour in Europe, he purchased a controlling interest in the paper and became editor-in-chief, a position which he continues to retain (1881). In 1870 Mr. Medill was a member of the Illinois constitutional convention; in 1871 he was appointed a member of the U. S. civil service commission; and in the latter year he was elected mayor of Chicago.

MEDI'NA (Arab. city), or, more fully, MEDINAT AL NABI (City of the Prophet), also called TABAH, TIBAH, etc. (the Good, Sweet, etc.), and mentioned by Ptolemy as Jathrippa: the holiest city throughout Mohammedanism, next to Mecca, and the second capital of Hedjaz in western Arabia, is situated about 270 m. n. of Mecca, and 140 n. by e. of the port of Jembo on the Red sea, and contains about 16,000 inhabitants (Burton). It consists of three principal parts—a town, a fort, and suburbs, of about the same extent as the town itself, from which they are separated by a wide space (the Munakha). Medina is about half the size of Mecca, and forms an irregular oval within a walled inclosure of 35 to 40 ft. high, and flanked by thirty towers—a fortification which renders Medina the chief stronghold of Hedjaz. Two of its four gates—viz., the Bab Al Jumah (*Friday gate*, in the eastern wall) and the Bab Al Misri (*Egyptian*)—are massive buildings with double towers. The streets, between fifty and sixty in number, are deep and narrow, paved only in a few places. The houses are flat-roofed and double-storied, and are built of a basaltic scoria, burned brick, and palm-wood. Very few public buildings of any importance are to be noticed besides the Great Mosque Al Haram (the Sacred), supposed to be erected on the spot where Mohammed died, and to inclose his tomb. It is of smaller dimensions than that of Mecca, being a parallelogram, 420 ft. long and 340 ft. broad, with a spacious central area, called El Sahn, which is surrounded by a peristyle, with numerous rows of pillars. The Mausoleum, or Hujrah, itself is an irregular square, 50 to 55 ft. in extent, situated in the s.e. corner of the building, and separated from the walls of the mosque by a passage about 26 ft. broad. A large gilt crescent above the "green dome," springing from a series of globes, surmounts the Hujrah, a glimpse into which is only attainable through a little opening, called the Prophet's Window; but nothing more is visible to the profane eye than costly carpets or hangings, with three inscriptions in large gold letters, stating that behind them lie the bodies of the prophet of Allah and the two caliphs—which curtains, changed whenever worn out, or when a new sultan ascends the throne, are supposed to cover a square edifice of black marble, in the midst of which stands Mohammed's tomb. Its exact place is indicated by a long pearly rosary (Kaukab Al Durri)—still seen in 1855—suspended to the curtain. The prophet's body is supposed to lie (undecayed) stretched at full length on the right side, with the right palm supporting the right cheek, the face directed towards Mecca. Close behind him is placed, in the same position, Abubekr, and behind him Omar. The fact, however, is that when the mosque, which had been struck by lightning, was rebuilt in 892 three deep graves were found in the interior, filled only with rubbish. Many other reasons, besides, make it more than problematic whether the particular spot at Medina really contains the prophet's remains. That his coffin, said to be covered with a marble slab and cased with silver (no European has ever seen it), rests suspended in the air, is a stupid story, invented by Christians, and long exploded. Of the fabulous treasures which this sanctuary once contained, little now remains. As in Mecca, a great number of ecclesiastical officials are attached in some capacity or other to

the Great Mosque, as ulemas, mudarisin, imaums, khatibs, etc.; and not only they but the townspeople themselves live to a great extent only on the pilgrims' alms. There are few other noteworthy spots to be mentioned in Medina, save the minor mosques of Abubekr, Ali, Omar, Balal, etc. The private houses, however, surrounded by gardens, fountains, etc., have a very pleasing appearance; and the city, although in its decay, is yet one of the busiest and most agreeable. Thirty medresses, or public endowed schools, represent what learning there is left in the city, once famed for its scholars.

MEDINA, a co. in n.e. Ohio. It is traversed by Black and Rocky rivers and Chippewa creek, and by the Atlantic and Great Western, and the Cleveland and Wheeling railroads; 425 sq.m.; pop. '80, 21,454—17,844 of American birth. The soil is undulating and shows much clay. All the common agricultural productions are staples, and coal is found in the region. There are manufactories of harnesses, lumber, and cheese.

MEDINA, a co. in s.w. Texas; 1175 sq.m.; pop. '80, 4,492—3,463 of American birth. The county, bounded on the n.e. by Medina river, is drained also by Rio Hondo and Seco creek. It is not particularly productive, water and timber being scarce. Stock-raising is the chief industry, and in 1870 there were over 40,000 head of cattle. Chief town, Castroville.

MEDI'NA DE RIO SECO (anc. *Forum Egurrorum*), a t. of Spain, in the province of Valladolid, 23 m. n.w. of the city of Valladolid, on the Sequillo, an affluent of the Douro. This place was a famous emporium in the 14th c., when its cloth and linen fairs were amongst the greatest in the kingdom; it is now a place of little or no importance whatever. There still exist some remains of its former greatness, in its arcades, arches, ruins of a palace, etc. In 1808 the town was given up to pillage by Bessières. Pop. 5,100.

MEDINA SIDO'NIA (Arab. *Medinatu-Shidunah*, "City of Sidon," so called by the Moors because they conjectured it to be the site of the Phenician *Asidon*), a city of Spain, 25 m. e.s.e. of Cadiz. It has a picturesque and splendid appearance at a distance; but within it is described as a "a whitened sepulcher full of decay." It is of Moorish origin, and contains a beautiful Gothic church and extensive ruins of a castle. The town gives the title of duke to the descendants of the famous Guzman the good, and is otherwise noted in Spanish history. Pop. 10,800, who carry on manufactures of earthenware.

MEDI'NET-EL-FAYÛM'. See FAYÛM.

MEDIOLA'NUM, the ancient capital of Gallia Cisalpina, now Milan. It lay along a little stream, whose modern name is the Olona, on a plain between the rivers Ticinus, now the Ticino, and Addua, now the Adda. It was said to have been founded by the Insubres, whose capital city it was, and who named it after a village in Transalpine Gaul, whence they had emigrated. It is first heard of in the time of the Gallic wars, but was of little importance, till, with the Insubres, it submitted to the Romans, 190 B.C. Its situation in the center of the plain of n. Italy made it a favorite place of residence, and by the time of Strabo it had gained some consequence. Its most prosperous period was in the 4th c., in the early part of which the emperor Maximian selected it for his residence. It was adorned with elegant public buildings, temples, theaters, baths, a mint, and in the latter part of the same century Ansonius ranks it as sixth among the cities of the empire. It was the headquarters of the Romans in their campaigns against the barbarians. Its prosperity continued till Honorius, in 403, withdrew to Ravenna, at the time of the Visigothic invasion under Alaric. It was sacked by Attila, but the Gothic kings re-established it as the imperial capital about 476. It was captured soon after by Belisarius, but in 539 it was recaptured by the Goths and Burgundians, and burned; and 300,000 of its inhabitants are said (almost incredibly) to have been massacred on this occasion. In the middle ages it became a great commercial city. See MILAN, *ante*.

MEDITA'TIO FU'GÆ, a phrase used in Scotch law to denote an intention to abscond from the jurisdiction of the ordinary courts. It is used chiefly in reference to debtors. Wherever a creditor in Scotland believes—i.e., can make an oath or affidavit that he has reasonable ground to believe—that the debtor is about to leave the country in order to evade payment of debts, he can obtain from a justice of the peace a warrant to apprehend the debtor. The consequence of this is that the debtor must either pay or give security, or remain in prison till the cause is tried. The process may be used either against natives or foreigners who have lived forty days in Scotland, but not where they are merely passing through the country on business or pleasure. The warrant may be executed on a Sunday as well as other days. It may also be executed within the sanctuary of Holyrood. Though creditors often avail themselves of this compulsitor to recover their debts, they are liable to an action if they maliciously and without cause procure the debtor's arrest; and if the debtor can show that he never intended, at the time in question, to leave the country, and that the creditor had no just ground to believe he so intended, an action of damages will lie.—In England and Ireland there is a similar process. See DEBTORS, ABSCONDING.

MEDITERRA'NEAN SEA, so named from its being almost entirely inclosed by the continents of Europe, Asia, and Africa, one of the greatest inland seas in the world, extends (inclusive of the sea of Marmora, but exclusive of the Black sea and sea of Azof)

to about 1,000,000 sq. miles. Its length, from e. to w., is about 2,326 m., its greatest breadth about 1080, but it is divided into two great basins by the approach of the European and African coasts in its middle. It is connected with the Atlantic ocean only by the straits of Gibraltar, through which a strong current continually flows into the Mediterranean. Another strong current also flows into it from the Black sea, which receives large supplies of fresh water, whereas the great rivers which fall into the Mediterranean itself are comparatively few; the principal being the Ebro, the Rhone, and the Po, from Europe; and the Nile, from Africa. It receives no large river from Asia. The evaporation from the surface of the Mediterranean is, on the contrary, greater than what takes place in the ocean generally, owing to the heat which proceeds from the African deserts, and the shelter which mountains afford from the cold winds of the north. The surface temperature, dependent on the intensity of solar radiation, is in summer about 5° above that of the Mediterranean. By the expeditions for the scientific exploration of the deep sea in 1869 and 1870 it has been ascertained that the effects of this surface-heating are limited to a depth of 100 fathoms; at every depth beneath this, even down to 1900 fathoms, the temperature of the Mediterranean, unlike that of the Atlantic, is *uniform*, and stands about 54° or 55°. This is, in fact, the *winter* temperature of the entire contents of the basin, from the surface downwards, and also the mean temperature of the crust of the earth in that region. In winter the temperature of the Mediterranean and the Atlantic approximate very closely. In consequence, probably, of the greater evaporation, the water of the Mediterranean, unlike that of inland seas in general, contains about one-sixth per cent more salt than the Atlantic ocean. Its specific gravity is almost everywhere greater than that of the Atlantic, being in the proportion of 1.0386 to 1.0283. Its color, when undisturbed, is a bright deep blue; but in the Adriatic a green, and in the Levant a purple tinge prevails, while the dark hue of the Euxine is indicated in its name of "Black sea." Different parts of the Mediterranean sea bear different names—as the Ægean sea, the Ionian sea, the Adriatic sea, or gulf of Venice, etc. Its northern coast is very much broken with bays and peninsulas, and abounds in harbors, affording the inhabitants of the south of Europe great advantages for commerce, of which the Mediterranean sea was the chief seat during all periods of history, till toward the close of the middle ages, when, after the invention of the mariner's compass, a spirit of maritime adventure sprung up, and the discoveries of the Portuguese and of Columbus led to the extension of commerce over the whole world. The commerce of the Egyptians, the Phenicians, the Greeks, and Romans, was almost entirely confined to the Mediterranean sea.

The depth of the Mediterranean sea is generally greatest in its western basin. In many places it is 3,000 ft. deep. Near Nice it is 4,200 ft. deep at a distance of only a few yards from the shore. In many places it is 5,000 ft. deep and more. The depth in the straits of Gibraltar is about 5,500 feet. It is highly probable that the coasts of Europe and Africa were once united here, and have been separated by some great convulsion; it is also supposed that land once stretched from Sicily to cape Bon in Africa, where now a ridge exists along which there is for the most part a depth of scarcely 200 ft., and in some places of little more than 40 ft., whilst on each side, at a short distance, the depth is more than 6,000 feet. The Mediterranean sea is subject to the w., n., and n.e. winds for more than two-thirds of the year, while in spring the s.e. and s.w. winds prevail. The most formidable of those winds which are peculiar to the Mediterranean sea is the *solano* or *levanter*. In the gulf of Venice the greatest tides rise about 3 ft., and in the Great Syrtis, 5 ft., but in most places the tides are scarcely observable. According to the measurements of Napoleon's Egyptian expedition (1799) the surface of the Mediterranean sea, in the neighborhood of Alexandria, was from 24 to 30 ft. lower than that of the Red sea at Suez; but more recent measurements have shown that the difference of level is inconsiderable, and that the mean level of the Red sea is at most 6 in. higher than the Mediterranean.

Of the 643 species of European sea-fishes, 444 inhabit the Mediterranean sea, some of which are peculiar to it. It has a greater number of species than the British and Scandinavian seas, but does not nearly so much abound in useful kinds. Tunny-fishing is extensively prosecuted on some parts of its coasts. It is rich in red coral, which is procured in great quantity on the coasts of Provence, of the Balearic Isles, and of Sicily, but particularly on the coasts of Bona and Barca in Africa.

The shores of the Mediterranean sea are in many parts subject to frequent earthquakes. Besides the existing active volcanoes of Etna, Vesuvius, and Stromboli, there are many evidences of recent volcanic action, and instances have occurred of islands suddenly upheaved by it, where volcanic fires have appeared for a short time.

MEDJIDIE, a Turkish order, instituted in 1852, and conferred after the Crimean campaign, to a considerable extent, on British officers. It has five classes; and the decoration, which differs in size for the different classes, is a silver sun of seven triple rays, with the device of the crescent and star alternating with the rays. On a circle of red enamel, in the center of the decoration, is the legend in Turkish, whose signification is "zeal, honor, and loyalty," and the date 1268, the Mohammedan year corresponding to 1852; the sultan's name is inscribed on a gold field within this circle. The first three classes suspend the badge around the neck from a red ribbon having green borders, and

the fourth and fifth classes wear it attached to a similar ribbon on the left breast. A star, in design closely resembling the badge, is worn on the left breast by the first class, and on the right breast by the second class.

MEDJIDIEH, a t. in European Turkey, called by the name of the sultan Abdul Medjid, and now the principal place in the Dobrudja. It was of little importance till after the Crimean war, when a large number of Tartars immigrated to Kustendji, 23 m. distant, and worked upon the railroad between the Danube and Kustendji. These and other Tartar immigrants afterwards settled at Medjidieh, and by 1862, the number of Tartar immigrants alone was estimated at 40,000. There are no trustworthy means for forming an estimate of its present size, but it has probably largely decreased.

MEDLAR, *Mespilus,* a genus of trees or shrubs of the natural order *rosaceæ,* sub-order *pomeæ,* having a 5-cleft calyx with leafy segments, nearly round petals, a large honey-secreting disk, and 2 to 5 styles, united together in the flower, but widely separated on the fruit, the upper ends of the bony cells of which are exposed. The COMMON MEDLAR (*M. Germanica*), a large shrub or small tree, spiny in a wild state, but destitute of spines in cultivation, is a native of the s. of Europe and of the temperate parts of Asia, but is a doubtful native of Britain, although it is to be seen in hedges and thickets in some parts of England. It has lanceolate leaves, not divided nor serrated, solitary large white flowers at the ends of small spurs, and somewhat top-shaped fruit, of the size of a small pear or larger, according to the variety. The Medlar is much cultivated in some parts of Europe, and is common in gardens in England, but it does not generally ripen well in Scotland without a wall. It is very austere, even when ripe, and is not eaten till *bletted,* when its tough pulp has become soft and vinous by incipient decay.

MEDLEY, JOHN, D.D.; b. England, 1804; educated at Oxford university, where he took the degree of B.A. with high honors at Wadham college in 1826, and the degree of M.A. in 1830. After taking orders in the church of England, he obtained, and for some years held, a living at Exeter, and was soon after made precentor of the cathedral in that town. In 1845 he was made bishop of the newly formed diocese of New Brunswick and was the first to hold that position.

MÉDOC. See FRENCH WINES.

MEDOWS, SIR WILLIAM, 1738?–813; b. in England; in 1756 entered the British army, in which he served for many years; first in Germany, then in the war with the American colonies, where he commanded the 55th regt., but was soon placed at the head of the 1st brigade of grenadiers and distinguished himself by his bravery at the battles of the Brandywine and St. Lucie. He afterward resided in India from 1781 to 1793; where he occupied several posts of responsibility, and was governor of Madrid from 1790 to 1792. His military renown was greatly increased by gallant conduct at the siege of Seringapatam and the rank of lieut.gen. was conferred upon him. After his return to England he for some time was governor of the Isle of Wight, and afterward succeeded Cornwallis as commander-in-chief in Ireland, (1801–03).

MEDUL'LA OBLONGA'TA. See BRAIN.

MEDULLARY RAYS. See EXOGENOUS PLANTS and PITH.

MEDUL'LARY SARCO'MA is one of the synonyms for that variety of cancer (q. v.) which is also known as encephaloid, cellular cancer, medullary cancer, fungus medullaris, etc. It grows more quickly, distributes itself more rapidly, and attains a more considerable bulk than any other form of cancer, tumors of this nature being often as large as a man's head, or even larger. Of all forms of cancer, it runs the quickest course, soonest ulcerates, is the most malignant, and causes death in by far the shortest time, often destroying life in a few weeks, or, at furthest, in a few months after its first appearance, unless it has been removed by an operation at an early stage.

When it ulcerates, fungoid growths form upon the surface; they are extremely vascular, and bleed on the slightest provocation. In this state, the disease has received the name of *Fungus hæmatodes.*

MEDULLA SPINALIS. See SPINAL CORD, *ante.*

MEDU'SA. See ACALEPHÆ, and GENERATIONS, ALTERNATION OF.

MEDUSA. See GORGO, or GORGON, *ante.*

MED'WAY, a river of England, rises near the northern border of the co. of Sussex, and, after a n.e. course of upwards of 50 m., it joins the Thames at Sheerness. At Penshurst, 40 m., from its mouth, it becomes navigable. The chief towns on its banks are Maidstone, Rochester, Chatham, and Sheerness. Large vessels do not ascend above Rochester bridge, but below that the river widens into an estuary, and forms an important harbor for the navy.

MEDWAY, a t. in Norfolk co., Mass., on the Charles river, and the Woonsocket division of the New York and New England railroad; pop. 3,721. It has 6 churches, 8 schools, 4 public halls, a library, a savings bank, 2 weekly newspapers, and manufactures of boots and shoes, brick, cotton and woolen goods, leather, organs, bells, etc.

MEEANEE, or MIYANI, a village in Sinde, Hindustan, on the Indus, 6 m. n. of Hyderabad, is celebrated as the scene of a great battle fought between sir Charles Napier and

the ameers of Sinde, Feb. 17, 1843. Sir Charles's force, composed partly of Europeans, and partly of natives, amounted to only 2,800 men; that of his foes 22,000, yet the latter were totally routed, losing in killed and wounded 5,000 men. Sir Charles's loss was only 256. The result of this victory was the conquest and annexation of Sinde.

MEEK, ALEXANDER BEAUFORT, 1814–65; b. S. C.; was a graduate of the university of Alabama; and having studied law, was admitted to practice at the bar of the state in 1835. At this time he inte rested himself in politics, and edited a democratic paper called the *Flag of the Union*. He served as a lieut. of volunteers in the war against the Seminoles in 1836. He was afterwards attorney-general of the state, and in 1839 edited a literary monthly at Tuscaloosa called the *Southron*. He was made county judge in 1842; in 1845 became a clerk in the office of the solicitor of the treasury in Washington; was U. S. district attorney for the southern district of Alabama 1846–50; and in 1853 was a member of the state legislature, having been also for 5 years associate editor of the *Mobile Daily Register*. In the legislature judge Meek distinguished himself by organizing and establishing the free-school system in Alabama. He was judge of probate in Mobile county in 1854; and in 1859 was again in the legislature, and held the office of speaker. He wrote and published several volumes of poems, sketches and other fugitive efforts, besides having compiled a history of Alabama. He was an enthusiastic and very able chess-player, and was one of the foremost contestants in the first chess tournament, held in New York in 1857, when he met on equal terms such players as Morphy, Paulsen, Marasche, Fiske, Thompson, etc.

MEEKER, a co. in central Minnesota, drained by the North Fork of the Crow river, on the St. Paul and Pacific railroad; 560 sq.m., pop. '80, 11,739—7,567 of American birth. The surface is diversified, and much of it heavily wooded with maple, elm, ash, and oak. The soil is fertile and produces large crops of wheat, oats, and Indian corn. There are a number of saw and flouring mills. County seat, Litchfield.

MEEKER, JOSEPH RUSLING, b. Newark, N. J., Apr. 27, 1827; educated at common schools in Cayuga county, N. Y. Early showed a taste for painting. After 3 years' study in New York, 1845–48, he went to Buffalo, opened a studio, and was an associate there with W. H. Beard and Thomas Le Clear, also artists. From 1852 to 1859 he worked at Louisville with moderate success, and in 1859 went to St. Louis. On the breaking out of the rebellion he joined the navy service as paymaster. While on a gunboat on the lower Mississippi river he first saw those weird swamp and lowland forest scenes from the sketches of which he has since made numerous paintings in a field all his own, with felicitous rendering of the dreamy languor in the hazy air of cypress swamps, and moss-draped groves of oak. At the close of the war he was one of the founders of the St. Louis art society, and thrice its president; also an active member of the St. Louis academy of fine arts. He is the writer of an article on Turner in the *Western Magazine* (Dec., 1877), St. Louis.

MEERA'NÉ, a prosperous manufacturing t. of Saxony, in the circle of Zwickau, 10 m. n. of the town of Zwickau. Until within the last few years, it was an unimportant, small country town; but it has recently increased rapidly in size and importance, through the development of its industrial resources. Its pop., in 1849, was 7,345; 1858, 11,147; 1861, 13,626; 1875, 21,277. The manufactories produce, almost exclusively, woolen and mixed fabrics; and employ about 15,000 looms, of which about 3,000 are in the town itself, and the rest elsewhere. There are upwards of 100 manufactories, the yearly products of which are estimated at upwards of £2,000,000. A large export trade is carried on with England, France, and America, three of the principal firms having set up establishments in New York. There are some large tanneries in Meerane. The town itself has within the last few years been very much improved.

MEER'MAN, GERARD, Baron, 1722–71, b. Holland; studied jurisprudence at Leyden, and soon acquired a reputation as a learned law writer. He held but two public offices, that of pensionary of Holland, to which he was nominated in 1748; and of envoy to England, whither he was sent in 1757. The rest of his life was spent in researches on law or the art of printing. On the latter subject he wrote his *Origines Typographicæ*, 1765, wherein he claimed for his countryman Lawrence Koster the honor of the invention of printing. His great legal work is the *Novus Thesaurus Juris Civilis et Canonici*, which appeared from 1751 to 1754, in 7 volumes.

MEERSCHAUM, a mineral existing in many parts of the world. In Europe, it is found chiefly at Hrubschitz in Moravia, and at Sebastopol and Kaffa in the Crimea; and in Asia it occurs abundantly just below the soil in the alluvial beds at Kittisch and Bursa in Natolia; and in the rocks of Eski-Hissar in the same district, it is mined so extensively as to give employment to nearly a thousand men. Meerschaum, from its having been found on the sea-shore in some places, in peculiarly rounded snow-white lumps, was ignorantly imagined to be the petrified froth of the sea, which is the meaning of its German name. Its composition is, silica, 60.9; magnesia, 26.1; water, 12.0. Almost all the meerschaum found is made into tobacco-pipes, in which manufacture the Germans have been for a long time pre-eminent. Vienna contains many manufactories, in which some very artistic productions are made: and pipes worth a 100 guineas, from the beauty of their designs, are by no means uncommon. The French pipe-makers have lately used meer-

schaum, and have lately displayed great taste in their works. When first dug from the earth, meerschaum is quite soft and soap-like to the touch, and as it lathers with water, and removes grease, it is employed by the Turks as a substitute for soap in washing. The waste in cutting and turning the pipes was formerly thrown away, but it is now reduced to powder, mixed into a paste, and compressed into hard masses, which are carved into inferior pipes.

MEERUT', MERUT, or MIRUT, a t., district, and division of British India. The town is the chief town of the district and province, and is on the Kalli Nuddi, about 42 m. n.e. of Delhi. Its most important edifice is the English church, a fine building, with an excellent organ, and large enough to accommodate 3,000 persons. The climate of Meerut is healthy. Pop. '71, 79,378. The cantonment is situated 2. m. n of the town; on the opposite side of the stream are quarters of the native infantry. Here, on May 10, 1857, the native troops revolted, shooting their own European officers, firing the bungalows, and massacring the European inmates without respect to age or sex. The *district* of Meerut has an area of 2,368 sq.m., and a pop. '71, of 1,273,914. The *division* of Meerut lies in the n.w. provinces; area, 10,947 sq.m.; pop. '71, 4,973,190.

MEETING, an assemblage of people called with a view to deliberate on some speci fied subject, or to accomplish some specified purpose. The proceedings begin with the choice of a chairman, or presiding officer, and consist in the proposing and seconding of resolutions, on which the voice or vote of the meeting is taken. The chairman, in addition to his deliberative vote, is often entitled to give a second or casting vote, in case of equality. Any number of persons may in this country assemble for any purpose not in itself illegal; but the use of force or violence, or any tendency towards it, may entitle the authorities to interfere with a meeting, as an unlawful assemblage. Meetings called, not officially, but by private arrangement, are looked on in the continent as a characteristically English institution; in most parts of the continent, the right of holding such assemblages is more or less restricted by law.

MEETING, is the name applied by the society of Friends to their various assemblies for worship and for the management of official business. 1. To their usual gatherings on several days of the week for worship, meditation and instruction. 2. The monthly meeting is an assembly of members from several contiguous congregations, charged with making provision for the poor and for the education of children; with the admission of persons desirous of joining the society; with giving attention to the proper performance of religious and moral duties among Friends; and with the administration of needed discipline. In this last duty is included the appointment of committees to see that the rules are observed and to settle difficulties among members by private admonition and counsel so as if possible to prevent their being brought before the meeting. And even when cases are introduced to the meeting similar committees are appointed to settle them informally if possible. In all disputes the practice of the society is to refrain from going to law. It therefore directs all its members to harmonize their differences by prompt and impartial arbitration. To the monthly meeting belongs the allowing and solemnizing of marriages. It keeps a record of marriages, births, and deaths among its members. 3. The quarterly meeting is composed of several monthly meetings. It receives answers from the monthly meetings to questions it had sent to them concerning the conduct of their members and of the care taken of them. The statements thus received are condensed into a report, also expressed in answer to inquiries previously received, sent by representatives to the yearly meeting. The quarterly meeting receives appeals from the judgment of monthly meetings and has supervision over their neglect of discipline and care. 4. The yearly meeting has the general superintendence of the society in the country in which it is established; and therefore as the accounts which it receives discover the state of inferior meetings, as particular exigencies require, or as the meeting is impressed with a sense of duty, it gives forth its advice, makes such regulations as appear to be requisite, or excites to the observance of those already made, and sometimes appoints committees to visit those quarterly meetings which appear to be in need of immediate advice. At the yearly meeting a sub-committee called the morning meeting is appointed to revise the official manuscripts prior to their publication and also to grant in the intervals of the yearly meeting certificates of approval to those ministers who "have a concern" to travel in the work of the ministry in foreign parts in addition to those granted by their monthly and quarterly meetings. Appeals from the quarterly meetings are heard by the yearly meetings. There are 10 such: in London, Dublin, New England, New York, Pennsylvania, Maryland, Virginia, the Carolinas, Ohio, and Indiana.—The QUARTERLY MEETING in the Methodist church is a general meeting, of the stewards, leaders, and other officers, for the purpose of transacting the general business of the "circuit" or "district." In the Methodist Episcopal church it is presided over by the "presiding elder," or by the minister in charge. Its special object, in addition to celebrating the love-feast, is to examine the spiritual and financial condition of the church.

MEGAC'EROPS, an extinct genus of animals found in the miocene formation of Colorado by prof. O. C. Marsh of Yale college. They belong, with other genera, *titanotherium*, *diconodon*, and *brontotherium*, to the family Brontotheridæ of Marsh, which have four nearly equal toes in the fore feet, and three in the hind feet, as in the tapirs. In size and conformation of skeleton they resemble the elephants, but they had shorter

limbs and probably no proboscis, but a tapir-like nose. Skull elongated, brain cavity very small, the cerebral hemispheres scarcely covering the olfactory lobes. A pair of horn cores is placed transversely upon the maxillary bones in both sexes. They belong to that section of the order of ungulates called *perissodactyls*, (q.v.).

MEGAC'EROS HIBERNICUS, or great-horned Irish elk, an extinct species of gigantic deer whose bones are found in the quaternary deposits of marl in the peat swamps of Ireland, and also of England, as well as in bone caverns. The largest were 11 ft. in height to the tips of the antlers, which were 12 ft. across. The females had no antlers. The bones were proportionately stronger than in living species, and the cervical vertebræ of the males were very heavy for the purpose of carrying the massive horns. The dentition was of the ordinary ruminant type. They are regarded as intermediate between the reindeer and fallow-deer, and their fossils are exclusively post-tertiary, but not extending to the historic period.

MEGADAC'TYLUS, a name given by prof. Edward Hitchcock to an extinct genus of bird-like reptiles whose fossils are found in mesozoic formations of the Connecticut valley. The leg bones of one of these were slender and hollow, and the walls thin and dense, as in birds. Its tracks were for a long time, with others in the same locality, regarded as those of birds.

MEGADERMA. See BAT, *ante*.

MEGALICHTHYS (Gr. great fish), a genus of fossil heterocercal ganoid fishes, so named from their large size, compared with the other fish of the period. They were covered with large strong rhomboid scales, composed externally of brilliantly polished brown enamel, usually granulated, as in the scutes of the recent crocodile. These scales have been found as large as 5 in. in diameter. The head was defended by similar strong plates, and the jaws were furnished with immense laniary teeth, of a size rarely attained, even in the largest modern reptiles, and so closely resembling them, that they were for some time considered as having belonged to some crocodilean animal. These teeth—specimens of which have been found measuring 4 in. long and two broad at the base—were smooth at the point, had a long furrowed root, and a hollow base, in which the new tooth was prepared. Numerous smaller teeth were scattered over the jaw among the large ones. The fish of this genus must have been the terror of the seas they inhabited. Their strong skeleton, large tail, powerful head, and ferocious jaws remarkably suited their carnivorous habits.

Three species have been described from the carboniferous strata of Edinburgh, Glasgow, and the center of England.

MEGALONYX. See MEGATHERIUM, *ante*.

MEGALOPOLIS, the later capital of Arcadia, in the Peloponnesus, was situated on the river Helisson, in the center of a spacious plain on the n.w. border of Arcadia. It is said to have been founded in 370 B.C.; being suggested by Epaminondas, after the battle of Leuctra and designed to become the capital and stronghold of the Arcadian confederation against Sparta. It occupied three years in building, and was then settled by drawing upon the population of 40 different towns. The number of inhabitants was insignificant in comparison to the size of the city, and the latter never rose to the height of importance that was anticipated for it. The Theban supremacy being overthrown, it was forced to ally itself to Macedonia, in order to strengthen itself against Sparta. In 222 B.C., the Spartan king, Cleomenes III. surprised the city, and a large number of its magnificent buildings were destroyed. Some of its inhabitants were put to the sword, and the remainder fled to Messene. Later on the fugitives returned and rebuilt their city, which, however, never after recovered its former importance. Megalopolis was the birthplace of the celebrated Greek gen. Philopœmen, who fought bravely in defense of the city against the Spartan king Cleomenes. Polybius, the Greek historian, was also a native of Megalopolis, his father being the head of the Achæan league after the death of Philopœmen. A statue in honor of Polybius was erected in his native city during his life.

MEGALOSAU'RUS (Gr. great lizard), a genus of fossil dinosaurians, or land-saurians, of gigantic size and carnivorous habits, whose remains occur in the rocks of the oolite period. The huge body of the animal was supported on four large and strong unguiculate limbs; specimens of the femur and tibia have been found measuring each nearly 3 ft., giving a total length of almost two yards to the hind leg; and a metatarsal bone 13 in. long shows that the foot had a corresponding magnitude. The sacrum was composed of 5 vertebræ, anchylosed together, as in the other dinosaurs. Buckland calculated that the megalosaurus must have been 60 or 70 ft. long; but it is not likely that a reptile raised so high above the ground would have its body and tail so large in proportion to its limbs, as in our modern lizards or crocodiles. There seems good reason for rather accepting Owen's more moderate estimate of 30 ft. as its whole length. A fragment of the lower jaw, containing several teeth in position, tells of its carnivorous habits. Only a single species has been referred to this genus. Its remains are abundant in the Stonesfield slate, in the lower oolite of Gloucestershire, and in the Wealden and Purbeck limestones.

MEGANTIC, a co. in Canada, Province of Quebec, intersected in the w. by the Grand Trunk railway; 745 sq.m.; pop. 18,878. Its surface is undulating and drained by lake St. Francis, lake Inverness, lake Joseph, and lake William, the Becancour river, and the River du Chene. Its mineral products are iron and copper, which are found in abundance. It has tanneries, grist and saw mill; and fulling mills. County seat, Leeds village.

MEG'APHONE, a combination of the speaking-trumpet and ear-trumpet, devised by Mr. Edison. It consists of two large funnels, each about 7 ft. long and 3½ ft. across the mouth, and connected at the smaller end with a flexible tube having a tip suitable to apply to the ear. Slight sounds may be heard at a distance of over 1000 feet. By the use of a large speaking-trumpet a conversation may be carried on between two stations two miles apart.

MEGAPODIDÆ, a family of birds, referred by some naturalists to the order *grallæ*, but more generally to the gallinaceous order, being regarded as allied to the curassows, etc. The feet are large and have large blunt claws. To this order belong the genera *megapodius* (see JUNGLE-FOWL), *leipoa* (q.v.), *talegalla* (q.v.), etc. The order is peculiar to New Holland and the neighboring islands.

MEG'ARA (MEGARIS, *ante*) was about 20 m. n.w. from Athens and built at the base of two hills, Caria and Alcathous, each defended by a citadel. Two walls, built by the Athenians during their protectorate over Megara, between 461 and 445 B.C., ran down from the city to its harbor, Nisæa. In the time of Pausanias, the Megarian capital had many temples and public buildings, of which only the most scanty ruins have been preserved. According to its local legends, the city was named for its founder, Megarus, a Bœotian, son of Apollo. Its walls, which were razed by Minos, were said to have been rebuilt by Alcathous, the son of Pelops. Hyperion, son of Agamemnon, is represented as the last king, after whose death the government became republican. In historic times the city seems to have been under the power of the Athenians, from whom it was wrested by Dorians from the Peloponnesus. It was now colonized by Messenians and Corinthians, and adopted Dorian institutions. At a time not definitely known it ceased to be subject to Corinth, and as an independent state rose to a high degree of power. It sent out many colonies, of which the most famous were Byzantium, Chalcedon, and the Sicilian Megara. It rivaled Athens as a naval power, and for a long time kept possession of Salamis, in spite of the continued efforts of the Athenians to recapture it. The government had originally been in the hands of the Dorian landed aristocracy, from whom it was usurped about 620 B.C. by Theagenes, who led the popular faction, and established himself as absolute ruler of the state. Upon his expulsion, soon after, a fierce contest took place between the democratic and aristocratic parties, of which Theognis, a bitter partisan of the latter, has given an account in his poems. After the Persian wars, Megara carried on hostilities with Corinth, against which she formed an alliance with Athens 461 B.C. But in 455 the Megarians repudiated the Athenian alliance, and put to death the Athenian garrison which had been stationed at Megara. In the seventh year of the Peloponnesian war the democratic party in Megara, fearing that the aristocratic faction would take advantage of the Lacedæmonian alliance to re-establish an oligarchy, resolved to surrender the city to the Athenians. An Athenian army captured Nisæa, but the arrival of Brasidas with a force of Lacedæmonians prevented the surrender of Megara. From this time Megara is but little heard of in history. A democratic form of government was re-established in 357; after the death of Alexander the great, the city passed into the control of Demetrius Poliocertes and Ptolemy Soter successively. Demetrius, the son of Antigonus Gonabas, captured and nearly destroyed it. It was afterwards partially rebuilt, and finally surrendered to the Romans under Metellus. Alone among the cities of Greece it was not restored by Hadrian; Alaric still further reduced it, and in 1687 the Venetians completely destroyed it.

MEGAR'IC SCHOOL. See EUCLID.

MEGARIS, a small mountainous region of Hellas, or Greece proper, bounded by Attica, Corinth, and the sea. It formed the north-eastern part of the isthmus of Corinth. The capital was MEGARA, famous amongst the ancients for its white-shell marble, and for a white kind of clay, of which pottery was made.—From Euclid, the philosopher, who was born at Megara about 400 B.C., the MEGARIC SCHOOL took its name.

MEGASTHENES (Gr., great strength), a name given by prof. J. D. Dana to a grand division of the higher mammals of a superior and powerful type. It includes the quadremana, carnivora, herbivora, and cetaceans. He has given the name *microsthenes* to inferior mammals, as the bats, insectivora, rodents, and edentates. There is a parallelism between these two divisions, the bats in the latter representing the monkeys in the former; the insectivora the carnivora; the rodents the herbivora, and the edentates the cetaceans. The marsupials and monotremes form a lower, or semi-oviparous division, while man forms the highest division, the archonts.

MEGAS'THENES, a Greek writer in the time of Seleucus Nicator, about 300 B.C. Seleucus sent him on a diplomatic mission to Sandrocottus, king of the Prasii, a people in India. There he spent a number of years, and on his return to Syria, gave a general historical and geographical account of India, including the first description of Ceylon.

His work is known only in such fragments of it as are quoted by Strabo, Arrian, and Elian. The former did not set a high estimate on the accuracy of Megasthenes. It is certain, however, that the works include much information in regard to the geography and social condition of Indian peoples previously entirely unknown to the Greeks.

MEGATHERIIDÆ, a family of extinct mammals of the order Edentata, named by prof. Owen, and containing several genera. Pictet gave it the name *gravigrades*, placing it between the sloths and the armadilloes. There are nine or more genera, 1 megatherium, 2 cœlodon, 3 lestodon, 4 megalonyx, 5 mylodon, 6 scelidotherium, 7 spherodon, 8 megalocnus, 9 myomorphus. See MEGATHERIUM, *ante*.

MEGATHE'RIUM (Gr. great beast), a gigantic extinct quadruped of the order Edentata, nearly allied to the sloth, found in the superficial stratum of the South American pampas. In structure, it is very near its modern representative, except that the whole skeleton is modified to suit the requirements of an immense heavy-boned and heavy-bodied animal, some 18 ft. in length and 8 ft. in height. The appellation tardigrade, which Cuvier applied to the sloth, cannot be given to the megatherium; its limbs were comparatively short and very strong, and the feet adapted for walking on the ground, approaching in this respect nearer to the allied ant-eaters, but with this peculiarity, that the first toe of each of the hind feet was furnished with a large and powerful claw, which was probably used as a digger to loosen roots from the soil, and enable the creature the more easily to overturn the trees on the foliage of which it browsed. The enormous development of the bones of the pelvis, the hind legs, and the tail, gave the animal great power when, seated on its hind legs and tail, as on a tripod, it raised its fore legs against the trunk, and applied its force against a tree that had already been weakened by having its roots dug up. The structure of the lower jaw seems to indicate that the megatherium was furnished with a huge prehensile tongue like that of the giraffe, with which it stripped the foliage from the trees.

The remains of several allied genera of huge edentata are associated with the megatherium in the pampas deposits. They form the family megatheriidæ of Owen, which includes mylodon, megalonyx, sceledotherium, etc., genera which are separated from megatherium chiefly from peculiarities in the dentition.

The modern sloth is a native of South America, and the fossil remains of these immense creatures, which represented it in the newer tertiaries, have been found only in this continent, the past and present distribution of the family being the same.

MEGERLE, ULRICH VON. See ABRAHAM A. SANCTA CLARA, *ante*.

ME'GRIM (Gr. *hemicrania*, the *migraine* of the French) is the popular term for neuralgia occupying one half of the head, or more commonly only the brow and forehead of one side. It is often periodical, coming on at a certain hour, lasting a certain time, and then entirely disappearing for a fixed interval. It may be induced by any cause that debilitates the system; it not unfrequently attacks women who have suckled their children too long; or it may be associated with hysteria; or it may arise, like ague, from marsh miasma; and sometimes no exciting cause can be detected.

When it is associated with anæmia (paleness and general debility), it should be treated with the preparations of iron, the shower-bath, nourishing food, and plenty of exercise in the open air. When it is strictly periodical, quinine in full doses should be tried (the bowels being previously well cleared out); and if the quinine fails, Fowler's solution of arsenic, given in small doses (three minims in a wine-glassful of water), three times a day, after meals, will be almost sure to remove it.

MEGRIMS—VERTIGO are the terms usually applied when a horse at work reels, and then either stands for a minute dull and stupid, or falls to the ground, lying for a time partially insensible. These attacks come on suddenly, are often periodical, are most frequent during hot weather, and when the animal is drawing up a hill, or exposed during heavy work to the full rays of a hot sun. Liability to megrims constitutes unsoundness, and usually depends upon the circulation through the brain being temporarily disturbed by the presence of tumors. Horses subject to megrims are always dangerous; if driven at all, they should be used with a breastplate or pipe-collar, so as to prevent, as much as possible, pressure on the veins carrying the blood from the head: they should be moderately and carefully fed, and during hot weather have an occasional laxative.

MAHÁDIA, the ancient Thurmæ Hercules, a t. of Hungary, 6 m. w. of Roumania, 15 m. n. of Orsova; pop. 1800. Since the time of the Romans it has been noted for its baths. The sulphurous springs are beneficial in gout and other diseases. They are annually frequented by many visitors.

MEHEMED or MEHEMET ALI, also MOHAMMED ALI, Viceroy of Egypt, was b. in 1769 at Kavala, a little town in Macedonia, entered the Turkish army at an early age, and, in 1799, was sent to Egypt at the head of a contingent of 300 troops to co-operate with the British against the French invaders. Here his fine military qualities rapidly developed themselves, and he at length became commander of the Albanian *corps d'armée* in Egypt. In 1806 he was recognized by the porte as viceroy of Egypt, and pasha of Three Tails; but was soon involved in disputes with the Mamelukes, who had long practically ruled Egypt. The struggle was finally terminated in 1811, by the mas-

sacre of the greater number of these at Cairo. The rest fled to Upper Egypt, but were expelled by Mehemed in the following year. They then took refuge in Nubia from their remorseless foe, but in 1820 he followed them thither, and they were utterly exterminated.

The Porte now felt alarm at his growing power, and with a view to break it, intrusted him with the command of an expedition against the Wahabis, a religious sect of Arabia. But the victories of his son, Ibrahim Pasha (q.v.), only rendered him more powerful, and his authority extended itself over a great part of the Arabian peninsula. Shortly after, he conquered Kordofan, added it to his dominions, and opened up a great trade in black slaves from the interior of Africa. About this time he began to reorganize his army on something like European principles, built a fleet, and erected fortresses, military workshops, and arsenals. His ambition, however, received a severe check by the total destruction of his new navy at Navarino, in 1827. In 1830 the Porte conferred on him the government of Candia, but this did not satisfy him; and in the following year, on a frivolous pretext, he sent out an army for the conquest of Syria, under Ibrahim Pasha, who, by his victory at Konieh (Dec. 20, 1832), brought the Turkish government to the brink of ruin. The European powers now stepped in, and a treaty was concluded (May 4, 1833), by which Syria was ceded to Mehemed, on condition of his acknowledging himself a vassal of the sultan. Neither of the belligerents was satisfied, and Mehemed continued to plot in his usual secret and crafty style, till sultan Mahmud was obliged in 1839 to declare war against his dangerous subject. The European powers again interfered, and Mehemed saw himself compelled to give up all his claims to the possession of Syria, and to content himself with getting the pashalic of Egypt made hereditary in his family. If the infirmities of age had not now begun to tell upon Mehemed, he might have become what many in fact have pronounced him to be—the regenerator of Egypt! He thoroughly cleared the country of robbers from Abyssinia to the mouths of the Nile; he may almost be said to have introduced the cultivation of cotton, indigo, and sugar into the country. While Syria was under his rule, he increased to an immense extent the mulberry plantations, and consequently the cultivation of silk; and to crown all his efforts, he established in Egypt a system of national education! In his last years, he fell into a sort of religious dotage, and at last, in 1848, resigned his viceroyship in favor of his son, Ibrahim Pasha (q.v.). Mehemed died Aug. 2, 1849.

MEHUL, Étienne Henri, 1763–1817; b. at Givet, France. At the age of 10 he was organist of his native village and was soon after destined for the church. The advent of a regiment and martial music fired his worldliness, and he found means to reach Paris. There, after fighting the unexpected misery of cold and hunger, at the age of 17 he attracted the sympathy of Glück, the composer. After several unsuccessful efforts his *Euphrosine et Coradin* achieved fame in 1790, and other compositions previously written were then brought to light. *Stratonice* appeared in 1792; and this was followed by patriotic national hymns for the army of the republic, entitled *Le Chant du Depart; Le Chant de Victoire; Le Chant du Rétour*, which won him high popularity. Other works appeared in rapid succession: in 1803 *Uthal;* afterwards *Une Folie, ou les Aveugle de Tolède;* and in 1817 *Joseph*, his most esteemed composition. Died in Paris.

MEIAPON'TÉ, a t. of Brazil, in the province of Goyaz, about 80 m. e.n.e. of the town of Goyaz, on the river Almas. In the neighborhood are some gold mines; and the district produces millet, barley, cotton, tobacco, and sugar. Pop. 8,000.

MEIGGS, Henry, 1811–77; b. N.Y.; was in New York, engaged in the lumber business, in 1835, and failed in the commercial crisis of 1837. He, however, made another effort in the same business in Williamsburg, L. I., was for a time successful, and was elected president of the board of trustees of the town; but in 1842 he again failed, and it was not until the outbreak of the gold excitement in California that he again became seemingly prosperous. He shipped lumber in large quantities to the Pacific coast; and his trade so increased that he was encouraged to build a large number of vessels, until, at length, a financial stringency in the San Francisco money market drove him to borrowing, and eventually his business collapsed, and he fled to South America. He settled in Chili, and entered into the business of a contractor for building bridges, and, by one of his contracts with the government of Chili, made a profit of $1,300,000. He afterwards devoted himself to railroad construction, and in Peru accomplished engineering works which are objects of general admiration. He made contracts for the construction of six railroads in that country, one of which, the Callao, Lima and Oroya railroad, ranks among the first public works of the kind in the world. It is recorded to the honor of Mr. Meiggs that, having by his industry and enterprise succeeded in greatly improving his impaired fortune, he returned to San Francisco and arranged to discharge all the obligations which were in existence there against him. He was a man of refined tastes; greatly interested in art, in which he was a connoisseur; and at the time of his residence in New York city was president of a prominent musical association.

MEIGS, a co. in s.e. Ohio; drained by branches of the Ohio river, which separates it on the s. and s.e. from West Virginia; 490 sq.m.; pop. '80, 32,235—2,273 of foreign birth. The surface is uneven and in large part covered by forests of valuable timber; wheat, hay, corn, and oats are staples. Bituminous coal, salt, and limestone are found; in 1870 over 200,000 tons of coal were mined. Chief town, Pomeroy.

MEIGS, a co. in e. Tennessee; drained by creeks emptying into the Tennessee and Hiawassee rivers, which bound it on the n.w. and s.; the East Tennessee, Virginia and Georgia railroad runs near the s.e. boundary; 225 sq.m.; pop. '80, 7,117—810 colored. The Blue Ridge mountains cover much of the surface, and the hill-slopes and bottom-land is well fitted for raising corn. The climate is very invigorating. County seat, Decatur.

MEIGS, BENJAMIN C., 1789–1862; b. Conn.; graduated at Yale college in 1809; at Andover theological seminary in 1812; was ordained in 1815; sailed as a missionary of the American board; reached Ceylon in 1816. He was stationed for many years at Tillipally. Returning for the second time to America in 1858, on account of ill health, he died in New York. He was a man of kind, conciliatory spirit, sagacious in judgment, and greatly esteemed by the natives as well as by his missionary associates.

MEIGS, CHARLES DELUCENA, 1792–1869; b. at St. Georges in the Bermuda islands; educated as a physician, taking degrees from both the university of Pennsylvania and the college at Princeton (1818). In 1820 he began practice in Philadelphia and was chosen a professor in the Jefferson medical college in 1840, a position which he held for 22 years. He was specially skillful in obstetrics and the diseases of women and children, to which he devoted most of his time. He published several treatises on these and kindred subjects, and also, in 1852, a memoir of Samuel G. Morton, M.D.

MEIGS, JAMES AITKEN, b. Philadelphia, 1829; received a medical degree from the Jefferson medical college, and in 1857 was appointed to the professorship of the institutes of medicine in the medical college at Philadelphia. In 1859 he was called to a similar position in the Pennsylvania medical college, whence he removed in 1868 to become a professor in the Jefferson medical school. Besides a number of scientific papers, he has published an edition of Kirke's *Manual of Physiology*.

MEIGS, MONTGOMERY CUNNINGHAM, b. Ga. 1816; received his education at the university of Pennsylvania and the U. S. military academy, graduating at West Point, July, 1836, and receiving the appointment of second lieut. in the artillery. In the following year he was exchanged into the corps of engineers, in which corps he became first lieut. in 1838 and capt. in 1853. During the period between his graduating and the year 1852 he was employed in various important engineering undertakings on the part of the war department, including the building of fort Delaware and the Delaware breakwater, improvements of the Delaware bay and river, the construction of fort Wayne, Mich., and forts Porter and Niagara, N. Y., and fort Montgomery, N. Y. In 1852 and for 8 years thereafter he was employed in superintending the Washington and Georgetown water-works, a magnificent engineering enterprise, by means of which those cities were supplied with water from the Potomac river by means of the Washington aqueduct. During this period he also superintended the erection of the capitol extension in Washington and the post-office extension, as well as the great iron dome of the capitol. In the early part of the winter of 1860 he was dispatched to forts Jefferson and Taylor, in Florida, with orders to place them in a position for defense, and in the following spring was made chief engineer of the fort Pickens relief expedition. On May 14, 1861, he was appointed col. 11th infantry; and May 15 quartermaster-gen. of the U. S. army, with the rank of brig.gen. In this important position gen. Meigs had the direction of the supply and equipment of the United States forces in the field during the continuance of the war. He was frequently obliged to make personal inspection of the quartermaster's department of the various armies during siege and field operations, this being particularly the case at Chattanooga in 1863 and during the battles of the Wilderness in 1864. On July 5, 1864, he was brevetted maj.gen. In Jan., 1865, he superintended the refitting of the army of gen. Sherman after its return from the march to the sea. In 1867 and '68 he made an inspection of the departments of the west and the Pacific coast; and in 1875 was sent to Europe on a special mission of examination of the staff department of the European armies.

MEIGS, RETURN JONATHAN, 1740–1823; b. at Middletown, Conn.; he was engaged in the attempt on Quebec under Arnold, holding the rank of maj., and was there taken prisoner. After his exchange in 1776 he became col. of a regiment raised in the following year by his own exertions, and served with great credit in the actions of Sag Harbor and Stony Point. He was naturally of an enterprising and restless spirit and was one of the first emigrants to that part of Ohio known as the Connecticut Reserve; settling at Marietta in 1788. He was commissary-gen. under Wayne in the Indian campaigns, and in 1801 was made an Indian agent by the government. It was while employed in this capacity at the Cherokee agency in Georgia that his death took place. In 1776 col. Meigs published in the *American Remembrancer* an account of the Quebec expedition, which has been reprinted (N. Y., 1864).

MEIGS, RETURN JONATHAN, Jr., 1765–1825; b. Middletown, Conn.; graduated at Yale in 1785; went with his father to Marietta, O., in 1788, and entered upon the profession of the law. He was chief-justice of the supreme court of Ohio in 1803–4; brevet col. of the U. S. army, serving in Louisiana 1804–6; a judge in Louisiana 1805–6; and U. S. district judge in Michigan 1807–8. He was U. S. senator from Ohio 1808–10; governor of that state 1810–14, and U. S. postmaster-general 1814–23. Died at Marietta.

MEINERS, CHRISTOPH, 1747–1810; b. Ottendorf, Hanover. Little is known of his early life. He was educated at the university of Göttingen, where he was appointed professor of philosophy, and afterwards rector. Of his numerous historical works the following are the most important: *Revision der Philosophie; Versuch einer Religions geschichte der ältesten Völker besonders Ægyptens; Historia Doctrinæ de Vero Deo; Geschichte des Verfalls der Sitten und Staatsverfassung der Römer.* Besides his own works, he edited in connection with J. G. Feder *Philosophische Bibliothek*, 4 vols.; and with Spittler *Göttingisches Historisches Magazin; Neueres Magazin*, 3 vols. Most of his works were designed to show the difference between past and present morals.

MEIN'INGEN, the capital of the duchy of Saxe-Meiningen-Hildburghausen, lies in a narrow valley, on the banks of the Werra. Pop. '75, 9,521. The ducal castle, built in 1681, contains a fine library and several art collections. The "English garden" attached to it is one of the finest in Germany. Meiningen has almost no trade.

MEIS'SEN, one of the oldest towns in the kingdom of Saxony, is situated on the left bank of the Elbe, 15 m. below Dresden. Its chief building is the cathedral, the finest Gothic church in Saxony, surmounted by an exquisite spire of open-work, and containing many monuments of very early times. There are here a number of brasses, some of them finer than any in England or Flanders. Meissen was founded in 928 by Henry I. of Germany, as a bulwark of his German territories against the Slavonians, and was long the capital of the markgrafdom of Meissen, which was subsequently merged in the duchy of Saxony. Otto I. founded the cathedral. It was, however, burned down at the beginning of the 13th c.; rebuilt 1266–93; since which time it has been twice destroyed by fire, and restored. The castle, built on a precipitous rock overlooking the town, and formerly the residence of the markgrafs, burggrafs, and bishops of Meissen, was rebuilt in 1471; and in 1710 was converted into a porcelain factory, but has recently been restored to more dignified uses. The famous porcelain factory, now provided with more suitable premises, employs about 400 hands. Other manufactures are iron, machinery, pottery, and ivory-carving. Pop. '75, 1302.

MEISSNER, AUGUSTUS GOTTLIEB, 1753–1807, b. Silesia; educated at Wittemberg and Leipsic, where he studied law. He was for a time a chancery clerk, and curator of the Dresden archives. In 1785 he was appointed to the chair of classical literature and æsthetics in the university of Prague; and for the last two years of his life he was director of the Fulda high school. He translated a number of dramatic pieces from Molière, and Destouches, and was himself the author of three fairly successful operas, *The Mufti's Grave; The Alchemist;* and *The Beautiful Arsene.* But his most popular work is his *Sketches*, 14 series of which were published between 1778 and 1796. They are a collection of miscellaneous stories, dialogues, anecdotes, and essays. These pieces were extensively translated and imitated in other languages, and a few of them were included by Thompson in his *German Miscellany.* Of a similar plan and character are the *Tales and Dialogues*, which appeared from 1781–89. Besides these smaller works Meissner wrote a number of romances, and historical novels of considerable length, such as *Alcibiades; Masaniello; Bianca Capello;* and *Spartacus.*

MEISSONIER, JEAN LOUIS ERNEST, b. Lyons, in 1811, of a poor family. At the age of 19, after a youth of little opportunity for improvement, and many hardships, he found his way to Paris to study painting, which he had already practiced in Lyons on works for which he and Daubigny received 5 francs a square yard—paintings made for exportation. He was soon admitted to the studio of Leon Cogniet, where his disposition to make small paintings of exquisite precision, and his neatness of touch in giving high relief to small figures, soon made him the leader of a distinct school. His first public exhibitions were in 1836, the "Chesspiayers," and the "Little Messenger." From that time he has had a continually increasing reputation, and his industry and care in the exquisite finish of his almost microscopic details has been maintained without sacrifice of the general effects. Théophile Gautier says of him: "He is original. What he has wished to do, he has done completely, in design, color, fineness of touch, and result." The smallest inanimate objects acquire a peculiar life and meaning under his touch, and when he has finished a painting it seems beyond the suggestion of improvement. Meissonier has won all the honors of his art in the salons and exhibitions of Paris, and is rich with the proceeds of his labor. His works are too numerous to name. One of his best, "A Charge of Cavalry," is in the possession of Mr. Probasco of Cincinnati, for which he paid $30,000. Meissonier has also succeeded in portraits, though not so remarkably as in his characteristic work.

MEJERDA RIVER, in n.e. Africa, flowing through Algeria and Tunis. It rises in the Great Atlas range and is formed by the juncture of several small streams; its course is n. and n.e., and it empties into the gulf of Tunis, about 24 m. n. of the city of Tunis. The extent of the whole course is about 200 miles. In ancient times it was known as the Bagradas, and Carthage was not far from its banks; but its course has since been greatly changed, and it now flows near the ruins of Utica.

MEJI'A, IGNACIO, b. Mexico, 1814; received his education at the institute of arts and sciences of Oaxaca. In 1829 he volunteered for the defense of his country against a Spanish invasion, and in 1833 was made capt. of grenadiers, and col. in 1846. He was

military commander and provisional governor of the state of Tehuantepec in 1852, and during the "war of reform" was prominent on the side of the liberals. In 1858 he was in command of a brigade, and fought the battles of Teotitlan and Pachuca; being defeated in the first of these, Oct. 20, 1861. He acted as quartermaster of the army which resisted the invasion of the French in 1861, and was engaged in the defense of Puebla in 1862, being taken prisoner when that stronghold capitulated in May, 1863. He was sent to France, and not released until the summer of 1864, when he returned to Mexico, and in 1865 was appointed a gen. of division, and made minister of war.

MEJIA, THOMAS, 1812–67, b. Mexico; a native Indian, who exercised great power over the Indian tribes in Mexico, and took a prominent part in Mexican affairs. He served with distinction through the war with this country in 1846–48. He quelled an insurrection in 1849, but six years later put himself at the head of one for the purpose of overthrowing gen. Comonfort. This movement was unsuccessful, as was a coalition which he organized the next year between the clericals and conservatives. In 1857, after several defeats, he was forced to surrender. In 1858 he drove the Juarez government out of Queretaro, and held out successfully against Juarez, till the triumph of the latter in 1860, when he resorted to guerilla warfare. He was a trusted adherent of Maximilian, but was finally captured and put to death.

MEK'HITAR, or MECHITAR. See MECHITARISTS, *ante*.

MEK'LONG, a t. of Siam, at the confluence of the Meklong river with the w. mouth of the Menam, 30 m. s.w. of Bankok. Pop. estimated at 10,000. The province furnishes salt for all the kingdom.

MEKONG, MEIKHONG, MAKIANG, or CAMBODIA, RIVER. See COCHIN CHINA, *ante*.

MEKRAN, or MUKRAN, a province of Beloochistan in Asia, lying between 25° and 28° n. lat., and 58° and 68° e. long. It is bounded on the s. by the Indian ocean, w. by Persia, and n. by Afghanistan and Sarawan, being about 500 m. in length and 200 m. broad. It comprises by far the greater part of Beloochistan, about 100,000 sq.m., and is divided into many petty districts, each having its separate chief. The n. part is very rugged, and is traversed from e. to w. by two ranges of mountains, while the lower or s. part is level, barren, and desolate. The inhabitants, of whom there are 200,000 or more, are not advanced in civilization. They practice polygamy and hold slaves. There is very little trade or manufacturing carried on. The vegetation is scanty, the most prolific natural production being the date-palm. Fishing is carried on to a very considerable extent, and is the main support of a large part of the people. The country is, as to government and law, in a wretched condition. The route used by Alexander the great on his return from Egypt is still to be seen, and with one exception is the only practicable road for an army between India and Persia.

MELA, POMPONIUS, a Latin writer—the first who composed a strictly geographical work—was a native of Spain, and is believed to have lived in the time of the emperor Claudius, but nothing whatever is known concerning him. Mela's compend is in three books, and is entitled *De Situ Orbis*. The text is greatly corrupted, on account of the abundance of proper names; but the style is good, and the author shows a very creditable diligence of research and discrimination in the use of his authorities. The *editio princeps* appeared at Milan in 1471; there are editions by Tschucke (1807), Weichert (1816), Parthey (1867). Mela was translated into English as long ago as 1585.

MELALEU'CA. See CAJEPUT.

MELAMPUS, in mythology, the son of Amythæon; his mother is said by different authors to be Aglaia, Rhodope, or Eidomene. He is represented as a physician and prophet, and is said to have acquired his powers of divination in this way: While he was sleeping, one day, before the house of his uncle, king Neleus of Pylos, some serpents which he had tamed licked his ears and wakened him, whereupon he understood the language of the birds, and could read the future. Apollo imparted to him all the secrets of the art of medicine. For his services in curing the Argolian women of madness, Anaxagoras gave him a third of the kingdom of Argos, and another third to his brother Bias. According to other mythologists, Melampus restored to sanity the three daughters of king Proetus of Argos, and was rewarded by their father with the hand of Iphianassa, the eldest, and with a third of the Argive kingdom; by her he had four children, Antiphates, Manto, Bias, and Pronoe. He was accounted by the Greeks the first physician and prophet; and his posterity were also endowed with prophetic gifts. He was worshiped as a god after his death, and a temple was erected in his honor at Ægosthena, in Megaris.

MELANCHO'LIA, as a disease, is the exaggeration of the natural and legitimate feelings of grief, despondency, and apprehension, which become morbid where the emotion is without a cause, disproportioned to the actual cause, or so intense as to disturb and destroy the exercise of the other mental powers. This dejection and suffering is found associated with exalted sensations, or delusions as to the personal or physical condition of the individual, which originate in habitually cherishing certain impressions, in fixing the attention upon certain vital processes, which may be unhealthy, or become so by the very concentration of thought bestowed upon them. The patient lives in fear of death,

in the conviction that he is differently or more exquisitely constructed than those around; that he labors under some foul or fatal disease; that he is destitute of strength or comeliness. This has been regarded as hypochondriacal melancholia—the *maladie anglaise*, and affects the opening of life. Similar feelings are called forth in reference to the social position. There arises a dread of poverty and want. The victim is haunted by imaginary debts, obligations, peculations. He feels incapable of extricating himself. The poor, as well as the rich, entertain such doubt and dread. They starve, in order to husband their resources. This affection prevails at maturity—at the period of greatest activity and usefulness. Toward the decline of life—although encountered at every age—morbid depression assumes the form of religious anxiety, despair, remorse. Moral statistics show that among the inhabitants of northern Europe the number of cases of melancholia exceeds those of mania; and it has been supposed that the rudiments of the malady may be detected in the original character, the temperament, and the habits of the race, as well as in the climate, domestic condition, and diet, by which these are modified. Defective blood nutrition, or anæmia, appears to be the physical state with which the great majority of cases of melancholia are connected, and to which all modes of treatment are directed. Powerful and permanent and depressing moral emotions act as effectively in arresting healthy digestion and alimentation, as the use of injudicious food, or the use of proper nourishment under circumstances such as the respiration of impure air, or indulgence in intemperate or degraded tendencies, which render assimilation impossible. The aspect of the melancholiac corroborates the view of inanition and exhaustion. The surface is pale, dry, cold, attenuated, even insensible; the muscles are rigid; the frame is bent; the eyes sunk, and fixed or flickering; the lips parched and colorless. There is a sense of exhaustion or pain, or impending dissolution. It has been remarked, that in proportion to the intensity of the internal agony is there an obtuseness or anæsthesia to wounds or external injuries. Such an immunity gives in lunatics an indifference to the most grievous forms of suffering, and may explain the conduct of many reputed martyrs and even criminals under punishment.—Haslam, *Observations on Madness and Melancholy;* Esquirol, *Maladies Mentales*, t.i. p. 398; Crichton, *Inquiry into Nature and Origin of Mental Derangement.*

MELANCHTHON, PHILIP, Luther's fellow-laborer in the reformation, was b. Feb. 16, 1497, at Bretten, in the palatinate of the Rhine, now in the grand duchy of Baden. His name was originally Schwarzerd (black earth), of which Melanchthon is a Greek translation. He was educated at the university of Heidelberg, where he took the degree of bachelor of philosophy in 1512. In the same year he went to Tübingen, studied theology, took the degree of master, and in 1514, gave lectures on the Aristotelian philosophy and the classics. About this time, he published a Greek grammar. On his relative Reuchlin's recommendation, he was appointed, in 1518, professor of the Greek language and literature in Wittenberg. He soon decided in favor of the reformation, and brought to the aid of Luther great attainments in learning, great acuteness in dialectics and exegesis, a remarkable power both of clear thinking and of clearly expressing his thoughts; and, along with all, a gentleness and moderation that most advantageously tempered Luther's vehemence. In 1521 he published his *Loci Communes Rerum Theologicarum*, the first great Protestant work on dogmatic theology. It passed through more than fifty editions in the course of the author's life. In 1530, he made a most important contribution to the cause of Protestantism in the Augsburg confession (q.v.). In 1541 he went to Worms, and soon after to Ratisbon, to conduct the cause of the Protestants in the conferences there. But the influence of the papal legate counteracted all his efforts for a peaceful accommodation, and his own party were much dissatisfied on account of the concessions which he made. After Luther's death Melanchthon lost in some measure the confidence of some of the Protestants, by those concessions to the Roman Catholics which his anxiety for peace led him to make; whilst the zealous Lutherans were no less displeased because of his approximation to the doctrine of Calvin on the Lord's supper. His consent, conditionally given, to the introduction of the Augsburg interim (q.v.) in Saxony, in 1549, led to painful controversies; and he was involved in various controversies, which filled the latter years of his life with disquietude. He died at Wittenberg, April 19, 1560. Melanchthon, although gentle, was emotional and excitable, and conciliatory in the extreme. As a public teacher, he was exceedingly admired, and students flocked to him from all parts of Europe. He was essentially a theologian and scholar, and in his habits, if not in his opinions, was the precursor of those acute and laborious divines who have in modern times shed so much luster on the German church. The most complete edition of his works (which comprise a Greek and Latin grammar, editions of and commentaries on several classics and the Septuagint, biblical commentaries, doctrinal and ethical works, official documents, declarations, dissertations, responses, and a very extensive correspondence with friends and the leading men of the age) is that by Bretschneider in his *Corpus Reformatorum* (28 vols. 1834–60). Melanchthon's life has been written by his friend Camerarius (1566), and frequently in the course of the present century. One of the latest is by Schmidt (1861). The tricentenary of Melanchthon's death (April 19, 1860) was celebrated with great solemnity throughout Germany.

MELANESIA. See MICRONESIA AND MELANESIA.

MELANORRHŒ'A, a genus of trees of the natural order *anacardiaceæ*. To this genus belongs the BLACK VARNISH TREE (*M. usitata*) of Burmah and the n.e. of India, called *Theet-tsee* or *Zitsi* in Burmah, and *Khew* in Munipoor. It is a very large tree, attaining a height of 100 ft, with large, leathery, simple, entire, deciduous leaves, and axillary panicles of flowers. It yields a viscid, rust-colored juice, which becomes black on exposure to the atmosphere, and is excessively acrid, causing swellings with much pain and fever if it touches the skin. It is, however, much valued as a varnish for painting boats, and vessels intended to contain liquids, and also as a size-glue in gilding. This black varnish is a considerable article of trade in India and Burmah.

MELANO'SIS. See TUMORS, *ante*.

MELANTHA'CEÆ, a natural order of endogenous plants; containing bulbous, tuberous, and fibrous-rooted plants, with or without stems, and having parallel-veined leaves which are sheathing at the base. The fruit is a capsule, generally divisible into three pieces.—There are about 130 known species, natives of all parts of the world, but most abundant in northern countries. Some resemble crocuses, and some are like small lilies. The order is characterized by a great prevalence of poisonous qualities. Some of the species are employed in medicine, particularly colchicum (q.v.), white hellebore (*veratrum album*, see HELLEBORE), and Sabadilla (q.v.). The root of *helonias dioica* is used in North America as an anthelmintic and tonic bitter. The plant grows in wet places, and is called *starwort* and *blazing star*, also *unicorn's horn* and *devil's bit*.

MELA-ROSA, the fruit of the genus *citrus*, and probably a variety of the lime (q.v.), cultivated in Italy. It receives its name from its fragrance being thought to resemble that of the rose. It is a small flattened fruit, with a protuberance at the tip, from which many raised ribs proceed in a star-like form to the circumference. The skin is yellow, thin, and adheres closely to the pulp.

MELASTOMA'CEÆ, a natural order of exogenous plants, containing about 1200 known species; trees, shrubs, and herbaceous plants, mostly natives of warm climates, although a few are found in the temperate parts of North America. They have opposite undivided leaves, destitute of dots. The flowers are regular.—None of the melastomaceæ possess poisonous properties; some are used in dyeing; the gratefully acid leaves of some are cooked and eaten—particularly those of species of *medinilla* and *astronia papetaria* in the Malay Archipelago; some yield eatable and pleasant fruits, as *blakea triplinervis* in Guiana, *clidemia hirta* in the West Indies, and *memecylon edule* in Coromandel. The wood of some is tough and hard.

MELAZZO. See MILAZZO, *ante*.

MEL'BOURNE, capital of the British colony of Victoria, in Australia, is situated chiefly on the n. bank of the Yarra-Yarra, about 9 m. by water and 2 m. by land above its mouth, in the spacious bay of Port-Phillip. Lat. 37° 48′ s., long. 144° 58′ east. Its streets are straight, regular, and wide, and are paved, macadamized, and plentifully supplied with gas and fresh water. Collins street, one of the leading thoroughfares, is one-third wider than the famous Broadway of New York. Melbourne is built of brick and stone, and contains many fine churches. Perhaps nothing gives stronger testimony to the wealth and enterprise of the inhabitants of Melbourne, than the rapidity with which so many noble institutions as adorn the city have sprung up among them. Among these, one of the chief is the university, with an annual endowment from the state of £9,000, and possessing valuable scholarships and exhibitions. It is a large building, in the shape of a parallelogram, and is surrounded by extensive grounds. It was opened in April, 1855, and has a respectable staff of professors, with a considerable attendance of students in arts, law, engineering, etc. The post-office, a magnificent structure, in the Italian style, elaborately ornamented with sculpture, was built in 1859. The Yan-Yean water-works, by means of which water is conveyed by iron pipes from a distance of 18 m., were opened in 1857. The parliament houses were erected in 1855, at a cost of £400,000. The buildings for the exhibition of 1880 cost above £70,000. Besides those mentioned, the chief institutions are the Melbourne hospital, the benevolent asylum, the immigrants' home, the servants' home, the orphan asylums, the lying-in-hospital, treasury, county and city courts, public library, custom-house, barracks, picture gallery, the numerous richly ornamented banks, the grammar-school, Scotch college, besides many other educational establishments, and numerous literary and scientific institutions and societies. There are three daily newspapers, one evening journal, and several weeklies and monthlies. Melbourne is the center of about a dozen converging lines of railway; several of these being, however, only suburban lines. There are several theaters and public parks. The temperature is moderate; the mean of the year being 59°, and the variation between the average temperature of January (midsummer) and July (winter), 19°. The annual rainfall is about 32.33 inches. Melbourne occupies the first rank among the ports of the British colonies, and is the most important trading town of the southern hemisphere. The pop., including the suburbs, is, '77, 244,700. The chief exports are gold, silver, wool, hides, cattle, and sheep. Six-sevenths of the entire commerce of the colony is carried on by Melbourne. For further information regarding trade, etc., see VICTORIA. Vessels drawing 24 ft. can come up to the mouth of the Yarra-Yarra, but are unable to ascend the river, on account of two bars which obstruct

its course. Melbourne, however, is connected with Sandridge on Port-Phillip by means of a railway 2 m. long. The chief industrial establishments of Melbourne are flour-mills, tallow-boiling works, and brass and iron foundries. It is the see of an Episcopal bishop and a Roman Catholic archbishop.

PORT-PHILLIP, on which Melbourne is situated, is a spacious and beautiful inlet of the South Pacific ocean, on the s. coast of Australia, and is 35 m. long, by about 25 m. broad. Its entrance, which is only 2 m. in width, is formed by two projecting promontories, called the Heads; and on these promontories strong fortifications were erected in 1861. Navigation at the entrance of the port is difficult, on account of the foul ground on either side, and the violence of the ebb and flood tides, which is caused by the unevenness of the bottom.

Melbourne was first colonized in 1835, and received its name from lord Melbourne, then the British prime minister, in 1837. It became the seat of a bishop in 1847, and in 1851 the capital of the newly-formed colony of Victoria. The discovery of gold in Victoria in 1851, which gave such a surprising impetus to the material prosperity of Melbourne, is treated of under VICTORIA.

MELBOURNE, WILLIAM LAMB, Viscount, English minister, was second son of sir Peniston Lamb, of Brocket hall, Herts, who was raised to the peerage. Melbourne was born in London in 1779. His university education he received first at Trinity college, Cambridge, and next at Glasgow, where he studied jurisprudence and politics under prof. Millar. He entered the house of commons for Leominster in 1805, and joined the whig opposition, under the leadership of Charles James Fox. He accepted the chief secretaryship of Ireland in Mr. Canning's government, and this partial alienation from the whigs was increased when he not only took office under lord Goderich, but remained for a short time in the government of the duke of Wellington. In 1828 the death of his father transferred him to the upper house. In 1830 he accepted the seals of the home office in the government of earl Grey, but his administration was by no means popular or successful. In July, 1834, earl Grey retired, and William IV. sent for Melbourne. In November, the king chose to consider the removal of lord Althorp to the upper house as the breaking up of the Melbourne ministry, and sent for sir Robert Peel, to form a conservative administration. But the house of commons resented the interference of the crown, and a new parliament having shattered the new government, Melbourne again became first lord of the treasury. On the accession of queen Victoria in 1837, it became the duty of Melbourne to instruct the young sovereign in the various duties of her high station, and fit her to perform her part as the constitutional monarch of a free country. In 1841 his government was succeeded by that of sir Robert Peel. Henceforward, Melbourne took little part in public affairs. He had little of the oratorical faculty, and was ineffective as a speaker, but possessed a cheerful temper and cordial frankness of manner, which made him many friends. He possessed classical tastes and rare social qualities, joined with an easy temper and careless habits. Sydney Smith, in his second letter to archdeacon Singleton, has described his character with an exquisite mixture of sarcasm and compliment. He married (1805) a daughter of the earl of Bessborough, who, under the title of LADY CAROLINE LAMB (b. 1785, d. 1828), attained some celebrity as a novel-writer and a correspondent of lord Byron. Melbourne died Nov. 24, 1848.

MELCHITES, the name given to Christians in Syria and other parts of the east, who, acknowledging the authority of the pope, and the doctrines of the church of Rome, adhere to the liturgy and ceremonies of the Eastern church. They conduct divine service in the vernacular tongue, and receive the Lord's Supper in both kinds. Their priests may be married before ordination, but not their bishops. They are chiefly to be found in Aleppo and Damascus. Their patriarch resides at Damascus. The name Melchites (lit. Royalists) dates from the 5th c., when they were supported by the emperors against the Monophysites (q.v.).

MELCHIZEDEK, or MELCHISEDEC, said in Genesis to have been "king of Salem and priest of the most high God," met Abraham—on his return from the successful pursuit of Chedorlaomer and his allies which he had undertaken for the rescue of Lot—refreshing him with bread and wine and pronouncing a remarkable blessing on him; after which Abraham gave him tithes of all the spoils, thus acknowledging his official superiority. In Ps. cx. David, in predicting the Messiah, says that by divine decree he was to be "a perpetual priest after the order of Melchisedec." This prediction the epistle to the Hebrews interprets in its application to the Lord Jesus Christ and as connected with the historical narrative, to all of which it ascribes a symbolic character, both in the particulars which it relates and in the silence which as to other things it maintains. As named Melchisedec he represented the king of righteousness, and as being king of Salem the king of peace. As in the narrative he stands alone with no mention of his father, mother, descent, birth, or death, he becomes a striking emblem of the uncreated Son of God and of a perpetual priest. As blessing Abraham and receiving tithes from him his superiority to Abraham and therefore to Levi the priestly son of Abraham was proved. Consequently the priesthood of Christ, which was according to the order of Melchisedec, was designed to supersede the priesthood of Levi and was superior to it, as Levi and his descendants were all under the power of death and would in succession pass away. These three passages of Scripture (in Genesis, the Psalms, and Hebrews,) contain all that

is said about him and all that is known. But in all the past centuries mystery has enveloped his name, and various conjectures concerning him have been made. The Jews perceiving his superiority to Abraham as indicated by the blessing bestowed and the tithes paid, explained it by supposing that the kingly priest was Shem, who as a survivor of antediluvian times had a right to be reverenced as the head of the human race. Jerome testifies that this was the opinion of the Jews in his day, and it was adopted in modern times by Luther, Melanchthon, Selden, Lightfoot, and others. Another old notion which Jerome says Origen cherished was that the royal priest was an angel. A small sect in the 4th c. called after his name taught that he was a power or influence of God greater than Christ. A few others regarded him as the Holy Ghost. Epiphanius says that some in his day believed that he was the Son of God in human form; to this opinion Ambrose seemed inclined and it has been held by many in modern times. Some among the Jews also regarded him as the Messiah. All these conjectures, however, are not only without support, but are with difficulty reconcilable with the Scriptures.

MELCHTHAL, ARNOLD VON, b. Switzerland, late in the 13th century. He was called Melchthal from the village of his birth in the canton of Unterwalden, but his name was Winckelried. Melchthal killed the servant of an Austrian bailiff, who had come to Melchthal to seize the oxen of Melchthal's father, a well-to-do proprietor in Unterwalden. In revenge, the Austrians put out his father's eyes, a tragic incident which is employed by Schiller in his *Wilhelm Tell*. When Melchthal heard of his father's blindness, he met his friends Fürst of the canton of Uri, and Stauffacher of the canton of Schwyz, on the banks of lake Lucerne, and all three took oath to do all in their power to liberate the three cantons from Austrian rule. This was in November, 1307; and the next year the mountaineers of the three cantons successfully opposed the Austrians. Arnold of Melchthal is said to have attempted, at the battle of Sempach, to break a line of Austrian spears, and to have died "gathering into his bosom the sheaf of foreign spears." The whole story of the three patriots of the three cantons, seems to be as much of a myth as the legend of William Tell with which it is connected. It is found in the *Chronicon Helveticum* of Ægidius Tschudi.

MELCOMBE, LORD. See DODINGTON, *ante*.

MEL'COMBE RE'GIS AND WEYMOUTH. See WEYMOUTH.

MELE'AGER, a legendary Greek hero, whose name is connected with the Argonautic expedition, and more conspicuously with the hunting of the Calydonian boar. He was the son of Oeneus, king of Ætolia, and Althæa, daughter of Thestius. Upon the seventh day after his birth the three Fates came to the palace of Oeneus, and pointing to a brand burning on the hearth, said that the child should not die till that brand should be spent. Althæa thereupon put water on the brand, and laid it away in a safe place. As Meleager grew to manhood he made a great name in war and in the chase. He went with the other heroes in quest of the golden fleece; and when Artemis, in her wrath, sent a monstrous wild boar to harry Calydon, Meleager was at the head of the hunters. Of this Calydonian hunt two stories are told. One says that Artemis had sent a wild boar into Calydon because Oeneus had not done sacrifice to her at the feast of harvest-home, and that Meleager, with many huntsmen and dogs, gave chase to the boar, which was soon slain. The Curetes and Ætolians wrangled over the boar's hide and head; and war breaking out between them, the Curetes had ever the worst, till Meleager, angered at Althæa, his mother, left the field and shut himself up in his house with Cleopatra, his wife; nor would he be moved by the prayers of his father and mother to go out against the Curetes till they had scaled the towers of Calydon; when his wife succeeded in persuading him to fight against the enemy, whom he repelled. The other and more modern legend represents all the Greek heroes as taking part in the hunt at the invitation of Meleager. Among them were Castor and Pollux, Theseus, Peleus, Jason, and Pirithous. Atalanta, daughter of Jasus, had come from Arcadia to join the hunt, but some of the heroes objected to a woman taking part in it. Their objections were overcome by Meleager, who was in love with her. The hunt began at once; Ancaeus and Cepheus were killed by the boar; Peleus killed Eurytion by accident. Then Atalanta gave the boar the first wound, Amphiaraus pierced his eye with an arrow, and the monster was finally killed by Meleager, who gave the head and hide to Atalanta. Meleager's uncles, the sons of Thestius, took the hide away from Atalanta, and were killed by Meleager. Althæa, enraged by the death of her brothers, burned the brand upon which her son's life depended, and Meleager wasted away and died. Althæa took her own life, Cleopatra died of grief, and Meleager's sisters, with the exception of two, were changed into birds called Meleagrides. The later legend is told in Swinburne's *Atalanta in Calydon*.

MELEAGER, a Greek epigrammatist in the 1st c. B.C. He compiled the first known Greek anthology, a collection called *The Garland*, and containing specimens from 46 authors. His anthology has been lost, but 131 of Meleager's own epigrams have been preserved. They are remarkable for their purity of style and grace of versification. The best edition is that published at Leipsic, by Graefe, in 1811.

MELEAGRIDI'DÆ. See TURKEY, *ante*.

MELEGNA'NO, or MALEGNANO, formerly MARIGNANO, a town of northern Italy, 10 m.s.e. of Milan, has a pop. of 5,000. It is famous as the scene of a great victory won by Francis I. of France over the Swiss and Milanese in the month of September, 1515; upwards of 20,000 men were slain. This conflict has been termed *the Battle of the Giants*. Francis accepted the honor of knighthood on the field from the chevalier Bayard. A second battle was fought here June 8, 1859, between a French force of 16,000 men, under marshal Baraguay d'Hilliers, and a rather larger body of Austrian troops, in which the latter were routed with a loss of about 1,400 killed and wounded.

MELENDEZ VALDES, Don JUAN, one of the most distinguished of the modern Spanish poets, was b. Mar. 11, 1754, at the village of Ribera del Fresno, in Estremadura. He studied at Madrid and subsequently at Salamanca, where he became intimate with the poet Cadalso, and acquired a thorough knowledge of English. It was Locke, he said, who first taught him to reason, and his writings contain imitations of Pope, Thomson, and Young. In his earlier period he wrote admirable anacreontics in praise of student-life; his descriptive poetry is also excellent. His style and sentiment are simple and natural; and the national idioms are used with singular grace and vigor. The first collection of his verses appeared in 1785, and soon became very popular. Four years before this publication Melendez Valdes was appointed a professor at Salamanca, and high political honors even seemed in store for him, but during the French invasion he allowed himself to be cajoled by Murat, and afterwards by Joseph Bonaparte; a weakness which was as disastrous to his prospects as it was discreditable to his character. When the invaders were driven out of the peninsula the unhappy poet was forced to accompany them. He died a proscribed traitor, at Montpellier, May 21, 1817. Melendez Valdes's anacreontics are the writings on which his fame rests, and they have procured for him the title of *Restaurador del Parnaso*.

MELETIUS, SAINT, of Antioch, a famous Greek ecclesiastic; b. in the beginning of the 4th c. at Melitene in Armenia Minor. His first important appointment was to the bishopric of Sebaste on the deposition of Eustathius in A.D. 357, but his position was made so unpleasant by the stubborn conduct of the people that he soon resigned, and retired to Berœa or Aleppo in Syria. The Arian controversy was now engrossing the minds of the people, and extinguishing true piety, but Meletius endeavored by his ministrations in the pulpit and his consistent private life to commend to his people the essential truths of the gospel. He thus won the respect of both factions, and in A.D. 360 was raised by universal consent to the see of Antioch. In his new and high position he felt bound to take a decided course in the prevailing dispute, and in his inaugural discourse in 361 he expressed his sympathy with the orthodox party. This confession re-awakened the spirit of controversy in the church of Antioch. The Arians charged him with Sabellianism and other crimes, and in a month he was banished by command of the emperor Constantius to his native Melitene. Euzoius was installed in his place. The orthodox party in the church of Antioch seceded from the communion of the Arians, and on the accession of the emperor Julian in 362 Meletius was recalled from exile. He now strove earnestly for two years to effect a union between the Eustathians and the orthodox party that had separated from the Arians at the time of his banishment, but the Eustathians refused to recognize any bishop who had been consecrated by the Arians. The council of Alexandria sent Lucifer of Cagliari to Antioch to settle the dispute, but he defeated the plan of reconciliation by ordaining Paulinus bishop of the Eustathians. Soon after the accession of Valens in 364 Meletius was again banished. By an edict of Gratian in 378 he was recalled, and reinstated in his bishopric. He again endeavored to effect a union with the Eustathians, but was unsuccessful through the unrelenting prejudice of Paulinus. Meletius died at an advanced age, while in the council of Constantinople in 381. His body was taken to Antioch and buried with great honor beside the tomb of the martyr Babylas. His funeral oration was pronounced by Gregory of Nyssa. A part of the inaugural discourse of Meletius at Antioch is printed in the fifth vol. of Galland's *Bibliotheca Patrum*.

MELETIUS, or MELITIUS; b. in Egypt about 260; was bishop of Lycopolis in Thebais in the beginning of the 4th c., and founder of the sect of the Meletians. During the severe persecution under Diocletian and Maximin, he and Peter, archbishop of Alexandria, were thrown into prison. Many Christians who had been led through torture to renounce their faith, repenting of their sin, repaired to the two bishops to receive absolution, and to be reconciled to the church. Peter was willing to receive the backsliders, on their doing penance, but Meletius refused to have any intercourse with them until the close of the persecution. A majority of the imprisoned Christians approved of his course. This caused a schism, and Meletius became the leader of the disaffected. After obtaining his freedom he traveled through the patriarchate, ordaining and excommunicating according to his own will, obtaining many followers, and disregarding the protests of the Egyptian bishops. This proselyting tour was extended to Palestine. But in 325 the council of Nice checked his career, compelling him to remain at Lycopolis as a mere titular bishop without active jurisdiction. He died soon after this. The Meletians called themselves *the church of the Martyrs*. They afterwards allied themselves with the Arians against Athanasias, continuing, however, a distinct sect until the 5th century.

MEL'FI, an ancient episcopal town of southern Italy, in the province of Potenza, 33 m. s. of Foggia, on a feeder of the Ofanto (anc. *Aufidus*). It is situated on a bed of lava to the n.e. of the lofty (3,000 feet) volcanic Monte Volture, now extinct, from which it is separated by a deep ravine. The once magnificent cathedral, erected in 1155, was almost entirely destroyed by an earthquake in 1851, which at the same time leveled many fine buildings, public and private, and destroyed about 1000 persons. The only evidences of volcanic action are the severity of the earthquakes which occasionally desolate the district, and the emission at times of carbonic acid and other gases from the lakes in the old crater of the volcano, throwing up columns of water, accompanied by internal rumblings. This phenomenon generally takes place when Vesuvius is in a state of activity. The district around the city is celebrated for its wine. Pop. 11,225.

MELIA'CEÆ, a natural order of exogenous plants, containing nearly 200 known species, trees and shrubs, natives of warm climates, and mostly tropical. Many of the species possess bitter, astringent, and tonic properties; some are used in medicine; the seeds of some yield useful oil; some are poisonous; some yield pleasant fruits; the wood of some is valuable. See CARAPA.—The lanseh is the most esteemed fruit of this order; and next to it is *milnea edulis*, a fruit of the n.e. of India, of which the edible part is the large succulent aril.—The CAPE ASH (*ekebergia capensis*) deserves notice among the timber trees of this order. It has a trunk two feet in diameter, and yields excellent tough timber, useful for many purposes.—*Melia azedarach*, a tree about forty feet high, with large bipinnate leaves, a native of Syria and other parts of the east, has long been much planted as an ornamental tree in the s. of Europe, and is now common in the southern states of North America. Its flowers are in large spikes, and very fragrant. The fruit is of the size of a cherry, somewhat elongated, pale yellow, containing a brown nut. The nuts are bored and strung for beads in Roman Catholic countries, whence the tree is often called BEAD TREE. It is also known as the *pride of India*, and is sometimes erroneously called *Persian lilac*. The fruit is sweetish, and not poisonous, although very generally reputed so. The bark of the root, which is bitter and nauseous, is used as an anthelmintic. The pulp of the fruit of the NEEM TREE or MARGOSA TREE (*azadirachta Indica*) yields a fixed oil, which is bitter, stimulant, and anthelmintic. The bark is a valuable tonic. The leaves are universally used in India for poultices.

MELIC GRASS, *Melica*, a genus of grasses, having a lax panicle, and spikelets of 2 to 5 awnless florets, of which one is generally imperfect. *M. uniflora* is a common grass in Britain, growing in the shade of woods. It is of a graceful and delicate appearance. Cattle are fond of it. *M. nutans* is a rarer British species. *M. altissima*, a Siberian species, growing to the height of 3 or 4 feet, has been introduced in some parts of Europe, and yields a considerable bulk of herbage. It is perennial.

MELICOC'CA, a genus of trees or shrubs of the natural order *sapindaceæ*, one of which, *M. bijuga*, a native of the West Indies, is there universally cultivated for its fruit. It is called the HONEY BERRY, and the *Jamaica bullace plum;* by the Spaniards *monos*, and by the Dutch *knipnee*. It is from 16 to 20 ft. high. The fruit is jet black, about the size of a bullace. The seeds are roasted, and eaten like chestnuts. Other species of melicocca yield eatable fruits.

MELIKOFF, LORIS, MICHAEL TARIELOVITCH, b. Russia, 1826; descended from a wealthy family of the Caucasian nobility. He was educated in the school of the guards of St. Petersburg, and joined the army with the rank of cornet, being promoted to a lieutenancy in 1847. He saw active service in the Caucasus, as adjutant to prince Vorowzoff, and gained a reputation for remarkable military talents. Here he led a number of expeditions against the fierce native soldiery, and had even the honor of defeating the celebrated Shamyl. During the Crimean war he had several successful engagements with the enemy in front of Kars, and on the capitulation of that stronghold was appointed its governor. In 1856, at the close of the war, he was made a maj.gen., and in 1863 lieut.gen. He was appointed adj.gen. in 1865, and gen. of cavalry in 1875; and in the following year was placed in command of the corps which was stationed on the Turkish frontier, and, on the declaration of war, marched into the enemy's territory. He besieged Kars and encountered serious resistance, being forced to retire; he, however, received reinforcements, defeated the Turkish army before Kars, and captured the fortress by storm. In 1880 the nihilist movements having become alarming, and the danger of Russia being apparently imminent, the czar Alexander appointed Melikoff to a position of absolute authority and power—an actual dictatorship without responsibility—in which delicate and dangerous situation he conducted himself in such a manner as to command the admiration of the statesmen of Europe. He restored order in a great measure where anarchy had been impending; and wielded his unlimited authority with such firmness and judgment as to fully sustain the wisdom of his appointment.

MEL'ILOT, *Melilotus*, a genus of clover-like plants of the natural order *leguminosæ*, with ternate leaves, differing from the clovers in the generally elongated racemes of flowers, the stamens not adhering to the corolla, and the 1 to 4 seeded tumid pods. All the species have a strong peculiar sweetish smell, which becomes more agreeable when they are dried, and is owing to the presence of coumarin (q.v.)—The COMMON YELLOW MELILOT (*M. officinalis*) is found in bushy places and the borders of fields in Britain

and most parts of Europe. It has an erect stem, two or three ft. high, and long loose axillary racemes of yellow flowers. A water distilled from the flowers is used in perfumery. The herbage is relished by cattle, but the produce is not large. It is an annual, but if frequently mowed without being permitted to flower, lives for several years.—The WHITE MELILOT (*M. vulgaris* or *leucantha*), common in some parts of Europe, has become naturalized in many places in Britain.—The BLUE MELILOT (*M. cærulea*), a native of the n. of Africa, with short racemes of blue flowers, is cultivated in many parts of Europe, particularly in Switzerland and the Tyrol, and has the peculiar melilot odor in a high degree. It was formerly much used in medicine as an anodyne, discutient, diuretic, sudorific, expectorant, and vulnerary; and to the many good qualities supposed to belong to it may be ascribed the high estimation in which the *schabzieger* or *chapzieger* cheese of Switzerland is held, to which it imparts its flavor. Where this cheese is made in considerable quantities the smell of melilot can be discerned even at a distance.—BOKHARA CLOVER (*M. arborea*) has attracted attention on account of the fiber of its stem, which is used for the same purposes as hemp.—The MESSINA MELILOT (*M. messinensis*), a native of the countries near the Mediterranean, is believed to be one of the plants called *lotus* by the ancients.

MELIORA'TIONS, the name used in Scotch law to denote the improvements made by a tenant to the estate or farm which he occupied. If the lease is terminated prematurely and abruptly he is entitled to compensation from the landlord for the value of the improvements; it is otherwise in England. Similar claims exist in Scotland in case of heirs of entail or life-renters improving the estate.

MELIPHAG'IDÆ. See HONEY-EATER.

MELIS'SIC ACID AND **MELISSIN.** See WAX.

MELISSUS, of Samos. See ELEATIC SCHOOL.

MELITA. See MALTA.

MELL, PATRICK H., D.D., LL.D., b. Ga., 1814. Left a destitute orphan by the death of his parents at the age of 14, but having received a good elementary education he earned the means to support himself for two years at Amherst college. He became a Baptist minister, and soon after the opening of Mercer university he was appointed professor of ancient languages. In 1851 he was called to the same professorship in the state university, and subsequently became vice-chancellor, resigning in 1872, but retaining the professorship. He was for 15 years president of the Georgia Baptist convention, and for 9 years of the southern Baptist convention. His published works are *Baptism; Corrective Church Discipline; Predestination; Essay on Calvinism; An Argument on the Subject of Slavery; A Sermon on God's Providential Government; a Treatise on Parliamentary Practice; Prayer as Related to Providence.*

MELLEN, GRENVILLE, 1799–1841; b. in Biddeford, Me.; son of chief-justice Mellen; educated at Harvard and, after graduating in 1818, studied law and engaged in practice in North Yarmouth. He was a poet of much taste and some power, and also a magazine writer. Besides many occasional pieces, such as *The Rest of Empires*, read in 1826 before the Maine peace society, he published, in 1827, *Our Chronicles of Twenty-six*, a satire; *Glad Tales and Sad Tales* (1829), a collection of prose papers; and, in 1833, *The Martyrs' Triumphs* and other poems. In New York he began the issue of a *Monthly Miscellany*, which failed after a few numbers. Mr. Mellen had long been a sufferer from consumption, and in 1840 made an unavailing voyage to Cuba for his health.

MELLEN, PRENTISS, LL.D., 1764–1840; b. at Sterling, Mass.; educated at Harvard, where he graduated in 1784, and began the practice of law at Bridgewater, Mass. He afterward resided in Biddeford and Portland, Me. In his profession he soon acquired a high standing and took an active part in political movements. From 1817 to 1820 he was one of the United States senators from Massachusetts. In 1820 he was made chief-justice of the supreme court of Maine, which position he held for 14 years.

MELLONI, MACEDONIO, 1800–54; b. Italy; began the study of natural philosophy at school, and had already entered upon extensive experiments in regard to the radiation of heat, when, in 1824, he was called to the chair of natural philosophy in the university of Parma. In 1831 he was forced for political reasons to leave Parma and remove to France. His discoveries in the radiation of heat he laid before the French academy of sciences, in a memoir to which that body paid little attention; but the English royal society deemed it worthy of the Rumford medal. Through the influence of his friends Arago and Humboldt, Melloni was allowed to return to Italy, and was appointed by the king of Naples director of the meteorological observatory on Mt. Vesuvius. Here he discovered the existence of heat in the lunar light. In 1849, though he had taken no active part in politics, he was dismissed from his position in the observatory, on account of his known liberal views. He lived thenceforward in his villa at Partici, near Naples, continuing his experiments. In 1850 appeared the first volume of his *La Termocrosi*, dedicated to Arago and Humboldt. He disputed the theories of Faraday as to the diminished velocity noticeable in an electric current passed through wires under ground, or under water, in comparison with an equal current passing through wires in the air.

MELMOTH, WILLIAM, 1666–1743; b. England; called to the bar in 1719, and a bencher of Lincoln's Inn, of which he was treasurer in 1730. He was associated with Peere Williams in the publication of Vernon's chancery *Reports*. He is, however, best known by his work *The Great Importance of a Religious Life Considered*, which was exceedingly popular in the last c., and of which over 100,000 copies are said to have been sold. It appeared anonymously, and was for a time ascribed to the first earl of Egmont. *The Memoirs of William Melmoth* was published by his son William in 1796.

MELMOTH, WILLIAM, 1710–99; b. England; son of William; called to the bar, and in 1756 made a commissioner of bankrupts; but he paid little attention to the practice of his profession, devoting his ample leisure to the cultivation of literature. Two volumes of *Letters on Several Subjects* appeared from his pen in 1742, under the pseudonym of sir Thomas Fitzosborne. They deal with a variety of subjects, chiefly literary and ethical. Five years later he published a translation of the *Letters* of Pliny, which is a model of elegance and exactness. This was followed in 1753 by a translation of Cicero's *Letters*, and in 1773 and 1779 by translations, with full notes, of the *De Amicitia* and *De Senectute*. He also wrote a treatise on the Christian religion; a poem on *Active and Retired Life*, which may be found in Dodsley's *Poems*; and a memoir of his father, which appeared in 1796 as *Memoirs of a late Eminent Advocate*.

MELO or MELLO, FRANCISCO MANUEL DE, 1611–65; b. Portugal; entered the army and became col. He was sent to suppress the insurrection in Catalonia against Philip IV. He entered the service of Portugal after its separation from Spain, but, falsely accused of murder, he was imprisoned, and for years was an exile in Brazil. He wrote in Spanish at the request of Philip IV. a history of the Catalonian revolution entitled *Historia de los Movimientos, Separacion y Guerra de Cataluña*, 2 vols. More than 100 volumes of his works have been printed. He wrote also several dramas and poems, the best of which was *Las tres Musas de Melo dino*.

MELODEON. See REED INSTRUMENTS.

MELODRAMA (Gr. *melos*, a song, and drama) strictly denotes a half-musical drama, or that kind of dramatic performance in which declamation is interrupted from time to time by instrumental music. The name, however, was first applied to the *opera* by its inventor, Ottavio Rinuccini. In Germany the melodrama retains its primitive character; but both in France and England the name has come to designate a romantic play, generally of a serious nature, in which great prominence is given to splendid decoration, to sensational incidents, and to an effective dénouement.

MELODY (Gr. sweet song) is a succession of musical notes regulated so as to be pleasing to all cultivated ears, and expressive as a whole of some particular feeling. It is opposed to harmony, in which different notes, being chords, are sounded together. The part intended for the leading voice in a harmonized piece of music is often called the *melody* or *air*. The character of a melody depends in a great degree on the rhythm and measure, as the same succession of sounds may, by the slightest change in the power of the notes, be so altered in character as to produce a different effect.

MELON, *Cucumis melo*, a plant of the same genus with the cucumber (q.v.), much cultivated for its fruit, which is sweet, with a delicious though peculiar flavor and smell. The melon is an annual, with trailing or climbing stems, lateral tendrils, rounded angular leaves, small, yellow, monœcious flowers, and large round or somewhat ovate fruit. It is supposed to be a native of the sub-tropical parts of Asia, although it has never been discovered in a wild state, and it was first introduced into England from Jamaica about 1570. It is said to derive its name from the Grecian island Melos. Its English name was originally *musk melon*. The varieties in cultivation are very numerous, some of them distinguished by a thick and warty rind, some by a rind cracked in a net-like manner, some by ribs and furrows, some by a perfectly smooth and thin rind; they differ also in the color of the *flesh* of the fruit, which is green, red, yellow, etc.; and in the size of the fruit, which varies from 3 or 4 in. to a foot or more in diameter. The melon is eaten either by itself or with sugar, and sometimes with pepper or ginger. The melon can be grown in the open air only in the most southern parts of Britain, and even there requires a hot-bed in spring. Its cultivation in hot-beds is extensively carried on in all parts of Britain, and very great care is bestowed on it. A loamy soil is best suited to it. The *setting* of the fruit by dusting the female flower with the pollen of the male flower is constantly practiced by gardeners. Warmth and bright sunshine are requisite to the production of fruit of good quality.—The WATER-MELON or CITRUL (*cucumis citrullus*), although rarely cultivated in Britain, is highly esteemed and much cultivated in almost all warm countries. It is a native of the warm parts of the old world. It has deeply lobed and gashed leaves, and a large round fruit with smooth dark-green spotted rind, and pink or white flesh; less sweet than the melon, but much more juicy or watery, and therefore much prized in many warm countries, not merely as an article of food, but for quenching thirst and allaying fever.—South Africa has another species of water-melon (*C. Caffer*), very valuable to the inhabitants.—The CHATE (*C. chate*) is a native of Egypt and Arabia. Its taste is sweet, and as cool as the water-melon.—The KAUKOOR (*C. utilissimus*) is a native of India, and much cultivated in some parts of that country; it has oval fruit, smooth, variegated with different shades of

yellow, and about 6 in. long, with much the flavor of the melon. The fruit will keep for several months, and is much used both raw and in curries. The half-grown fruit is pickled. The seeds contain much farina and oil, and are ground into meal; the oil is also expressed, and used both for food and in lamps. The seeds of others of this genus may be used in the same way; and they are said to be useful as a diuretic medicine, and for relief of strangury.

MELO'RIA, a small island of the Mediterranean, about 5 m. in length and 1 in breadth, 4 m. from Leghorn. In 1284 the Genoese gained a famous naval victory over the Pisans in the vicinity of Meloria, by which the latter were deprived of their maritime supremacy. An ancient Pisan tower stands on a rock to the s. of Meloria.

MELOS, or MILO, an island of the larger Cyclades in the Grecian archipelago, or Ægean sea, about 70 m. n. of Crete, and 65 m. e. of Peloponnesus; pop. 4,000. It is 14 m. long, and 8 broad, and has on its n. coast one of the best and safest natural harbors in the Levant. The surface is generally mountainous, and of a volcanic character, and there are hot mineral springs, and deposits of sulphur. The soil is fertile, and produces largely in fruit, wine, and oil, while affording also excellent pasturage for cattle. In the e. part of the island, near the port, is the chief town, called Milo; and near are extensive remains of the ancient capital of the island. Near the sea the ground is marshy, and the air is unwholesome in summer. This island is said to have been colonized first by the Phenicians, and afterwards by the Lacedœmonians. An attempt made by the Athenians to reduce it during the Peloponnesian war, was unsuccessful, but some years later they besieged the town, put the adult males to death, carried away the women and children into slavery, and occupied the place by a colony of Athenians. Melos fell successively under the dominion of the Romans, the Byzantine emperors, Venice, and the Turks: it is now a part of Greece. In 1820 admiral Dumont found in Melos the since celebrated statue known as the "Venus of Milo," and which now stands in the Louvre. This statue was without arms when found, and in 1877 it was reported that the lost members had been found near the locality where the statue was originally discovered. The highest eminence on the island is Mt. St. Elias, 2,538 ft. high. The Cyclades group of islands are believed to have formed in antediluvian times a part of a continuous chain of mountains connected on the n. with the mountains of Attica, and by the island of Melos with the western mountains of Candia on the south. Between Melos and Argentiera, a rocky island to the n., is a channel half a mile wide, which has an evil notoriety for its peculiarly dangerous character.

MELPOM'ENE (the Singing One), one of the nine Muses, specially invoked as the muse of tragedy.

MELROSE, a t. in Middlesex co., Mass., 8 m. n.w. from Boston, on the Boston and Maine railroad; pop. 3,414. It has seven churches, 14 public schools, 2 post-offices, a public park, a library, 1 weekly newspaper, a volunteer fire department, and manufactures of furniture, boots and shoes, sewing-machine needles, silver polish, etc. It is supplied with water from Spot pond. It is pleasantly situated, and is an attractive place for residence of business men from Boston.

MELROSE', a pleasant village at the foot of the Eildon hills, on the s. bank of the Tweed, having a population of 1405 at the census of 1871. It is famous for the ruins of its noble Cistercian abbey, founded by king David I. in 1136. The original pile having been destroyed during the wars of the succession, the monastery began to be rebuilt about 1326. The work was helped by large grants from king Robert Bruce, and his son king David II., but proceeded so slowly that it was scarcely finished at the reformation, in the middle of the 16th century. It was in the second pointed style, with one or two approaches to third pointed, and was beyond doubt the most beautiful structure of which Scotland could boast in the middle ages. What now remains are the chief portions of the conventual church, measuring 251 ft. in length, and some fragments of the cloister, which would seem to have been a square 150 ft. deep. The tracery and carvings, cut in stone of singular excellence, are scarcely surpassed by any in England. In the pages of Scott, Melrose shines with a splendor which its meager history fails to sustain. Its line of abbots showed one saint, St. Waltheof, the stepson of its royal founder. King Alexander II. chose his sepulture within its walls; Bruce left it the legacy of his heart; and it gave tombs to that flower of Scottish chivalry, the knight of Liddesdale, and to his kinsman, the heroic Douglas who fell at Otterburn. But its annals have little else to record. As a seat of piety and learning, its renown is eclipsed by the older and humbler monastery founded by St. Aidan, about the middle of the 7th c., and commemorated by the Venerable Bede as the home of Eata, of Boisil, of Cuthbert, and of Drycthelm. "Old Melrose," as it was called after the 12th c., stood about two m. below the modern abbey, on a beautiful promontory almost encircled by the Tweed. It was burned by Kenneth, king of Scots, in 839, and seems never to have recovered the blow. After it had lain waste for many years, we hear of it about 1073, as giving shelter, for a short season, to a few fugitive monks. All that survived the erection of the later abbey was a chapel dedicated to St. Cuthbert, and still famous about the middle of the 15th c. as a resort of pilgrims. The *Chronica de Mailros*, a series of brief obits and annals from 731 to 1275, has been twice printed, first among the *Quindecem Scriptores*

Historiæ Anglicanæ, published by bishop Fell at Oxford in 1684; and again by Mr. Joseph Stevenson, for the Bannatyne club, at Edinburgh in 1835. The charters of the more modern abbey were printed by Mr. Cosmo Innes, at Edinburgh in 1837, for the same society, at the cost of the duke of Buccleuch, in two sumptuous quartos, with the title of the *Liber S. Marie de Melros*.

MELTON-MOW'BRAY, a market-town of England, in the county of Leicester, and 16 m. n.e. of the town of that name, on the Eye near its junction with the Wreak, which is navigable to the Soar-Navigation, about 11 m. above the town. Stilton cheese is manufactured, and pork-pies are extensively made, chiefly for retail in the London, Manchester, and Leeds markets. In the vicinity are numerous hunting-seats, and the town, with stabling accommodation for 800 horses, is the central rendezvous of the famous Melton hunt. There are breweries, tanneries, and 5 banks. Pop. '71, 5,011.

MELUN, an ancient t. of France, capital of the department of Seine-et-Marne, built on an island and on both banks of the Seine, 28 m. s.e. of Paris. The manufactures are cement, bricks, tiles, and hats, and there is a trade in timber, grain, and flour. Melun, the *Melodunum* of the Romans, was stormed five times during the 9th c. by the Northmen, and fell into the hands of the English after a siege of six months, in 1419, and was held by them for ten years. Pop. '76, 11,315.

MELVIL, Sir JAMES, OF HALLHILL, 1535–1617, was the third son of sir John Melvil or Melville of Raith, Scotland, who was convicted and executed at Stirling on charges of high treason brought by archbishop Hamilton, on account of his devotion to the principles of the reformation. His estates were confiscated and the widow and children reduced to poverty. Young Melvil was sent to France and became page of honor to the bishop of Valence, and was afterwards attached to the service of the constable Montmorenci. Under him he saw his first military service in Flanders in 1553, and in 1557 was taken prisoner at the battle of St. Quentin after the defeat of the constable's forces. Two years afterwards he obtained his release and was dispatched to Scotland on a secret mission. During his absence occurred the tournament in which Montmorenci had the ill fortune to kill Henry II.; and at Melvil's return he judged it best to turn his steps towards Germany, where he was employed by the elector palatine. While on a visit to France in 1561 he for the first time met queen Mary of Scotland, to whom he tendered his allegiance and sword; and in 1564, having received a summons through Moray, he returned to his native land and presented himself to Mary at Perth. Shortly afterwards he was sent to England as ambassador to queen Elizabeth, and the account given in his memoirs of this embassy is of great historical value. Again in 1566 he was sent to England to bear the news of the birth of an heir to the Scottish throne. In the eventful period which followed, Melvil displayed much prudence and policy. He adhered to the queen so long as there appeared to be any hope of her ultimate success, but after she was committed to Lochleven castle, was received into some favor by the regency; but not being a favorite of the earl of Arran, his name was struck off the list of privy councilors. In 1590 he was attached to the queen's household. *The Memoirs of Sir James Melvil of Hal-hill; Containing an Impartial Account of the most Remarkable Affairs of State during the last Age, etc.*, was published in 1683 by his grandson, George Scott. This edition differs in many respects from a manuscript afterwards found, in what is thought to be sir James's handwriting; the latter was printed in 1827 at Edinburgh.

MELVILL, HENRY, D.D., 1800–71; b. at Pendennis castle, Cornwall, England; educated at St. Peter's college, Cambridge, where he took his degree in 1821. After taking orders he became the incumbent of the parish of Camden chapel, in London; and filled successively the offices of principal of the East India college, chaplain of the Tower of London, chaplain to the queen, 1853, canon of St. Paul's, 1856; and in 1863 became rector of Barnes, and a rural dean. His reputation, both as a finished and elegant writer and as a pulpit orator of power and eloquence, gave him a very high position among the English clergy. In 1848 he was elected incumbent of what is known as the golden lectureship of St. Margaret's. A great number of his lectures and sermons have been published in England and republished in this country. Of these the *Golden Lectures* and a number of others were printed without his consent. In 1847 a New York house published in two volumes 68 sermons, printed with the consent of the author. We may also note *Voices of the Year; Golden Counsels* (1857); and *Persuasions to a Christian Life*, as among the best of his writings. Melville is described by the author of *Random Recollections* as "certainly the greatest rhetorician among our metropolitan preachers. He clothes the most commonplace ideas in language which is so rich in the ornaments of rhetoric that they are often mistaken for conceptions of the most brilliant character. He is exceedingly partial to the use of analogy in addressing his hearers. And his analogies are often exceedingly happy; at times they are particularly striking. . . . . He arrests the hearer's attention the instant he begins, and carries him with him, a willing captive, to the close of his sermon." A severe taste will sometimes consider his analogies extreme in their range.

MEL'VILLE, the name of an island, a sound, and a peninsula in the n. polar regions of America. The island is in lat. between 74° 30′ and 77° n., long. between 105° 40′ and 117° 30′ west. Greatest length, 200 m.; greatest breadth, 130 m. It is separated on the

west by Fitzwilliam and Kellet straits from Prince Patrick island, the most western island of these regions. In 1819 lieut. Parry, who gave its name to Melville island, passed the winter here with his crews, in the vain hope of finding in summer a passage westward to the Pacific. Melville sound, about 250 m. long by 209 m. broad, extends immediately south-east of Melville island. It communicates with the Arctic ocean on the west by Banks's strait, and with Baffin's bay on the east by Barrow strait and Lancaster sound. Melville peninsula, abutting from the continent of British North America, is bounded on the north by Fury and Hecla strait, and connected with the main land by Rae isthmus. It is 250 m. in length by about 160 m. in average breadth. Lat. 66° 10′ to 69° 50′ n., long. 81° to 87° west.

MELVILLE, ANDREW, an eminent Scottish reformer, was b. Aug. 1, 1545, at Baldovy, on the banks of the South Esk, near Montrose. He was educated at the grammar school of Montrose, whence he removed in his fourteenth year to the university of St. Andrews. Here he remained four years, and left it with the reputation of being "the best philosopher, poet, and Grecian of any young master in the land." He then proceeded to Paris, where he continued his studies for two years. His reputation must have been already considerable, for in his twenty-first year he was chosen regent in the college of St. Marceon, Poictiers, whither he had gone a perfect stranger, to acquire a knowledge of law. Some time afterwards he proceeded to Geneva, where he was more in his element, both politically and religiously, and where, by the influence of his friend Beza, he was appointed to the chair of humanity in the academy. He returned to Scotland in 1574, and was, in the course of the same year, appointed principal of the university of Glasgow, where his scholarship, energetic discipline, and intrepidity of character exercised a most quickening and elevating influence. When the regent Morton exclaimed on one occasion, "There will never be quietness in this country till half a dozen of you be hanged or banished," Melville is said to have replied: "Tush, man; threaten your courtiers so. It is the same to me whether I rot in the air or in the ground; and I have lived out of your country as well as in it. Let God be praised, you can neither hang nor exile his truth!" In 1580 Melville was chosen principal of St. Mary's college, St. Andrews. Here, "besides giving lectures on theology, he taught the Hebrew, Chaldee, Syriac, and rabbinical languages." In 1582 he preached the opening sermon before the general assembly, and boldly "inveighed against the bloody knife of absolute authority, whereby men intended to pull the crown off Christ's head, and to wring the scepter out of his hand." The assembly applauded his intrepidity, drew up a remonstrance in a similar spirit, and appointed Melville and others to present it. In less than two years Melville was summoned before the privy council, on account of a sermon preached at St. Andrews. He declined to appear, maintaining that whatever a preacher might say in the pulpit, even if it should be called treason, he was not bound to answer for it in a civil court, until he had been first tried in a church court. For this denial of secular jurisdiction he was condemned to imprisonment, but escaped to London, where he remained till the downfall of Arran in the following year. After an absence of twenty months he returned to Scotland and resumed his office at St. Andrews. He was repeatedly elected moderator of the general assembly and rector of the university. A remarkable instance of his plain speaking took place at Cupar in 1596. Melville was heading a deputation to "remonstrate" with the king. James reminded the zealous remonstrant that he was *his* vassal. "Sirrah!" retorted Melville, "ye are *God's* silly vassal; there are two kings and two kingdoms in Scotland—there is king James, the head of this commonwealth; and there is Christ Jesus, the king of the church, whose subject James the Sixth is, and of whose kingdom he is not a king, nor a lord, nor a head, but a member." In 1605 Melville was called to England to attend the famous conference at Hampton court. Having ridiculed the service in the chapel royal in a Latin epigram, he was summoned before the English privy council, where his temper gave way, and he broke out into a torrent of invective against the archbishop of Canterbury for encouraging popery and superstition, profaning the Sabbath, etc. The king, violating every principle of justice, immediately sent him to the Tower, where he remained for more than four years. In 1611 he was released on the solicitation of the duke of Bouillon, who wanted his services as a professor in his university at Sedan in France. Melville, now in his sixty-sixth year, would fain have gone home to Scotland to lay his bones there, but the king would on no account hear of such a thing; and he was forced to spend his old age in exile. Melville died about 1622, but neither the date of his death nor the events of his last years are ascertained. See *Life of Andrew Melville* by Dr. M'Crie (2 vols. 1819).

MELVILLE, HERMAN, an American author, was b. in New York, Aug. 1, 1819. At the age of 18 he shipped as a common sailor on a voyage to Liverpool; and in 1841 he went again before the mast on a whaling voyage to the Pacific. Ill-treated by the capt., he deserted at Nukaheva, Marquesas islands, and was kept four months as the prisoner of a savage tribe in the Typee valley, whence he was rescued by an Australian whaler, and taken to Tahiti. After visiting the Sandwich islands he shipped on a U. S. frigate, and returned to Boston in 1843. In 1846 the first literary result of his adventures was published in *Typee*, a spirited account of his residence in the Marquesas. *Omoo*, a continuation of his adventures in Oceania, appeared in 1847, in which year he married a

daughter of chief-justice Shaw of Massachusetts. *Mardi*, a strange philosophical romance, in 1848, was followed by *Redburn* in 1849; *White Jacket, or the World in a Man-of-War*, 1850; *Moby Dick, or the White Whale*, 1851; *Pierre, or the Ambiguities*, 1852; *Israel Potter*, 1855; *The Piazza Tales*, 1856; and *The Confidence Man*, 1857. In 1860 he embarked in a whaling vessel for a new tour round the world. *Battle Pieces* (1866) appeared after his return.

MELVILLE, VISCOUNT. See DUNDAS.

MELVILLE ISLAND, off the n.w. coast of Australia, from which it is separated on the e. by Dundas strait and on the s. by Van Diemen's gulf and Clarence strait, while Bathurst island lies to the w., being separated from Melville island by Apsley strait; it is 70 m. in length and 30 m. wide, and extends from lat. 11° 8′ to 11° 56′ s., and from long. 130° 20′ to 131° 34′ east. The coast is in general high and steep, the surface being in great part table-land, though it rises to the height of 150 or 175 ft. in the central part. The *fauna* and *flora* in general correspond to those of Australia. The natives are superior to those of the continent both in physique and in mental capacity. The climate is, of course, very warm, and during the wet season is not healthful.

MEMBERED, in heraldry. When a bird has its legs of a different color from its body, it is said to be membered of that color.

MEMBERTOU, HENRY, 1500–1611: b. Canada; a medicine-man in the Micmac tribe. He was friendly to the French colonists who arrived in 1604, and fought a number of Indian tribes hostile to the French. Lescarbot wrote a poem in honor of the victory gained by Membertou in 1607 over the Armouchiquois, a tribe in the vicinity of the Merrimac river. Three years later he, his wife, and three sons were baptized as Christians. The next year, under the care of the French missionaries, he died at Port Royal at the estimated age of 110.

MEMBRA'NA PUPILLA'RIS, the name given to a very thin membrane which closes or covers the central aperture of the iris in the fetus during a certain period of gestation, but which disappears in the seventh month.

MEM'BRANE, in anatomy. This term is applied to designate those textures of the animal body which are arranged in the form of laminæ, and cover organs, or line the interior of cavities, or take part in the formation of the walls of canals or tubes. The structure and special uses of some of the most important of the animal membranes are noticed in separate articles, such as MUCOUS MEMBRANE, SEROUS MEMBRANE, etc.; and the membranes in which the fetus is inclosed—commonly called the fetal membranes—are described in the article PLACENTA. The membranes which cover and protect the brain and spinal cord are commonly termed *meninges*, from the Greek word *menina*, a membrane.

MEMBRANE, (*ante*), a name given to different thin organs, in the form of supple, more or less elastic tissues, for the purpose of enveloping or separating other organs, and in many cases, of secreting certain fluids. Bichat divided membranes into simple and compound. Simple membranes are of three kinds, mucous, serous, and fibrous. Mucous membranes line the cavities which communicate externally with the skin, as the mouth, intestinal canal, genito-urinary passages, internal surface of the eyelids, and the ramifications of the respiratory passages, the eustachian tubes and middle ear. Mucous membrane has three layers; a fibro-vascular layer, composed of blood-vessels, nerves, and connective tissue, which is continuous with the tissue beneath and interlacing with it; a more superficial layer, called basement membrane, which is described as structureless, and upon which rests the superficial layer, or epithelium, the latter presenting a variety of structure in various parts of the body. The two lower layers, the fibro-vascular and the basement membrane are continuous with the two lower layers of the skin, in reality forming the same organ, which passes under the common name of corium. The basement membrane is not in all localities susceptible of demonstration. The epithelium is composed of numerous cells called epithelial cells of various forms. The chief purpose of the mucous membranes are to secrete mucus to lubricate the various passages, at the same time that the mucous fluid performs other physiological offices. The salivary mucus, to some extent, aids digestion, and the digestive fluid (gastric juice) is a species of mucus; so also is the pancreatic fluid, and the product of the various intestinal glands. See EPITHELIUM, *ante*. The serous membranes line all the shut or closed cavities, and are of two kinds; those lining the cavities of the thorax and abdomen, the pleuræ (q.v.) and peritoneum (q.v.), and those which line the cavities of the joints. See SYNOVIAL MEMBRANES, *ante*. The third species of simple membrane of Bichat is the fibrous, divided into two sections; enveloping aponeuroses, the fibrous capsules of joints and the sheaths of tendons—and the enveloping membrane of bone, the periosteum, the dura-mater (the internal periosteum of the skull), the fibrous membrane of the spleen and other glandular organs. See SPLEEN, *ante*. The compound membranes Bichat divided into three sections. 1. Sero-fibrous, composed of fibrous and serous layers intimately adherent, as the pericardium, dura-mater, and tunica-albuginea. 2. Sero-mucous, composed of serous and mucous layers, as the gall bladder at its lower part. 3. Fibro-mucous, formed by the union of fibrous and mucous membrane, as the mucous membrane of the nasal fossæ, gums, etc. It will be perceived that the compound membranes

form a classification which embraces elements classed among the simple membranes; and this is natural, seeing that the compound are made up of simple membranes.

MEMBRÉ, ZENOBIUS, 1645–87; b. at Bapaume, France; became a member of the Franciscan order, and went as a missionary to Canada in 1675; accompanied La Salle upon his expedition to the Mississippi in 1679, stopping at fort Crèvecœur, on lake Peoria, where he aided in making peace between the Iroquois and Illinois Indians; descended the Mississippi with La Salle in 1682, and returned the same year to France, where he published an account of the expedition. After acting for a time as warden of a convent at Bapaume, he came again to America, and accompanied La Salle in his final expedition by sea to Texas in 1684, and remained in Fort St. Louis, where, with his companions, he was massacred by the Indians.

ME'MEL, a governmental district of Prussia, forming its most northerly boundary towards Russia, and included in the circle of Königsberg. The chief town, Memel, situated in 55° 43′ n. lat., and 21° 6′ e. long., and lying at the northern extremity of the Kurisches Haff, at its opening into the Baltic, is a well-fortified, active seaport. Pop. '75, 19,796. It has an excellent large harbor, and is the center of an active trade in corn, wood, hemp, and amber; the produce of Lithuania and other Russian provinces being brought thither for exportation. The town itself, which is surrounded by an unproductive sandy plain, possesses several good manufactories for the preparation of brandy, soap, linseed-oil, etc., and extensive saw-mills, iron-foundries, and amber and iron works, the last of which are noted alike for their strong cables and their light and elegant cast-iron goods. Ship-building is carried on at Memel, which owns about 100 ships, and has a good school of navigation; in 1874, 1284 vessels entered, and 1340 left, the port, and steam-packets maintain a communication with many of the other Baltic ports. Memel was founded in 1253 by the Livonian order of knights; in 1404 it was fortified by the Teutonic knights. In consequence of a fire in 1854 it has of late years undergone an almost complete renovation, and is now a clean, well-built town.

MEMLING or HEMLING, HANS, 1435–95 (about) probably a native of Bruges, but very little is known about the date and place of his birth or the time of his death, which could not, however, have been later than 1495. Several other ways of spelling the name are given, but "Memling" has decidedly the best authority. He was, at least, an artist of the Flemish school, if not of Flemish birth, and painted a large number of altar-pieces and pictures on sacred subjects, to which his work was almost wholly confined. It is a matter of great uncertainty to say what were and what were not his productions. Rathgeber designates over one hundred pictures, but very few of these are fully authenticated. The earliest of those which it is thought are genuine is dated in 1450 and the latest in 1491. Memling is said to have served under Charles the bold of Burgundy, and it is related that after the battles of Granson and Morat, he was admitted as a wounded soldier, into the hospital of St. John's, at Bruges. Here it was, at all events, that were painted many of the finest works attributed to him. Of these, the principal are; the illustration in a picture composed of many small compartments, of the history of St. Ursula and her companions; the marriage of St. Catherine, his finest picture, and one of the best of that c., consists of a central composition representing the marriage, and two wings or side pieces, depicting the beheading of John the Baptist and the vision of John the Evangelist. There are many pictures, presumably Memling's, at Berlin, Antwerp, the Hague, and other parts of Europe, and two or three in England. Specially worthy of praise are:—"St. Christopher carrying the Child," "Joys and Sorrows of the Virgin," and "The Journey of the Three Kings from the East." In all of these there is not only great harmony in color and effective use of light and shade, but most noteworthy of all is the wonderful perfection in matters of detail. The last named picture contains nearly 1500 objects and figures of small size, all of which are elaborated in the most minute manner, and this, too, without neglect of general effects.

MEMLOOKS. See MAMELUKES, *ante*.

MEM'MINGEN, a t. of Bavaria, near the right bank of the Iller, 42 m. s.w. of Augsburg. It has handsome streets, carries on manufactures of woolen, cotton, and linen goods, gun-powder, and iron-ware; the chief part of the trade is in hops, wool, leather, and grain. Pop. '75, 7,762

MEMMINGER, CHARLES GUSTAVUS, b. Würtemberg, Germany; and was brought to this country at a very early age by his mother. By her death he was soon left an orphan. Much interest was taken in him by gov. Thomas Bennett of Charlestown, S. C at which place he was then situated. He was educated at the South Carolina college, where he graduated in 1820 and subsequently studied law. He opened practice in Charlestown, where he acquired some note as an opponent of the Calhoun doctrine of nullification; and on that subject he wrote a satirical book which he called the *Book of Nullification* (1832), and which was written in an imitation of Biblical style. He was elected to the state legislature, and made strong arguments in opposition to the suspension of specie payments by the banks after the panic of 1839; and he was for many years head of the legislature finance committee. Shortly after the outbreak of the rebellion he was made secretary of the treasury by the confederate government, and held that position for three years, 1861–64, when he resigned.

MEM'NON, a celebrated hero, the son of Tithonus and Eos or Aurora, who led to Troy a host of Æthiopians, to support the cause of Troy after the fall of Hector. He was said to be clad in armor made by Hephæstus or Vulcan, and killed Antilochus, son of Nestor, in single combat. He was killed in single combat with Ajax or Achilles. Others suppose he was ruler of the nations between Susa and Troy, or a vassal of the Assyrian monarch Teutamus, who sent him with 10,000 Æthiopians, and as many Susians, to the Trojan war. After his death, his corpse was carried by Aurora to Susa, and buried in the acropolis of that town, Memnoneia; or his ashes, collected in a silver urn, borne to his sister Himera at Paphos, and thence to Palliochis or Paltos; or to the banks of the Belos, near Ptolemais. The river Paphlagonios flowed from his blood, and his companions were changed into birds. But the Memnon of the older writers obtained a still greater renown by the name being transferred at a later period by the Greeks to a celebrated colossus, seated in the plains of Thebes, on the left or west bank of the Nile; while the name of Memnoneia was applied by the Egyptian Greeks to the sepulchral quarter of Thebes, as Diospolis was to the right or east bank. Memnoneia, or supposed palaces of Memnon, also existed at Abydos. The two statues—one of which is the celebrated vocal Memnon, one of the wonders of the old world—are at a place called Koum-el-Sultan. Both are seated on thrones, and represent the monarch Amenophis III., of the 18th dynasty, whose name and titles are inscribed on the plinths behind. At the sides of the throne are sculptured the wife and mother of the monarch, about 18 ft. high. The height of each of these colossi appears to have originally been 60 ft., and they are made of a coarse hard gritstone or breccia. They are at present known by the sobriquets of Tammy and Shammy, and were originally placed before the propylon of an Amenopheion or palace-temple of Amenophis III. in this quarter at Thebes. The easternmost of these colossi is the celebrated vocal statue, distinguished from its companion by having been anciently broken and repaired from the lap upwards with blocks of sandstone, placed horizontally, in five layers. The statue was either injured by Cambyses, to whom the Egyptian priests ascribed most of the mutilations of the Theban temples, or else thrown down by an earthquake. The peculiar characteristic of this statue was its giving out at various times a sound resembling the breaking of a harp-string or a metallic ring; and considerable difference of opinion has prevailed as to the reason of this sound, which has been heard in modern times, it being ascribed to the artifice of the priests, who struck the sonorous stone of which the statue is composed, the passage of light draughts of air through the cracks, or the sudden expansion of aqueous particles under the influence of the sun's rays. This remarkable quality of the statue is first mentioned by Strabo, who visited it in company of Ælius Gallus, about 18 B.C.; and upwards of 100 inscriptions of Greek and Roman visitors incised upon its legs, record the visits of ancient travelers to witness the phenomenon, from the 9th year of Nero, 63 A.D., to the reign of the emperor Severus, when it became silent. Amongst other visitors whose names are recorded are those of the emperor Hadrian and his wife Sabina; Septimius Severus also visited the statue, and is conjectured to have restored it; for Juvenal mentions it as broken in half, and no notice of it occurs under the Pharaohs or Ptolemies The identity of this statue and of Memnon is mentioned in the gloss upon Manetho, and by Pausanias and the inscriptions.—Besides the mythical Memnon, two historical personages of this name are known—one a Rhodian commander of the mercenaries of Artabazus in the war against Artaxerxes-Ochus, who subsequently fled to Macedon, and afterwards entering the Persian service, defended Persia against Alexander, 336 B.C.; but finally died at the siege of Mitylene, 333 B.C.: the other, a Greek historian, who wrote a history of Heraclea Pontica, in 16 books, which have been epitomized by Photius—Welcker, *Episch. Cycl.* 211; Strabo, xv. 728, xvii. 816; Ælian, *H. A.*, v. 1; Jacobs, *Die Graeber des Memnon;* Eusebius, *Hieron*, p. 154; Juvenal, xv. 5; Letronne, *Sur le Mon. d'Osymandyas;* Wilkinson, *Top. of Thebes*, p. 33; Vossius, *De Hist. Græc. à Westermann*, p. 226; Diodor. xvi. 52.

MEMORY. This is one name for the great and distinctive fact of mind, namely, the power of retaining impressions made through the senses, and of reviving them at after-times without the originals, and by mental forces alone. The conditions of this power have been already stated (see ASSOCIATION OF IDEAS, HABIT). We shall advert here to some of the arts and devices that have been propounded from time to time, for aiding our recollection in the various kinds of knowledge.

Perhaps the commonest remark on this subject is, that memory depends on attention, or that the more we attend to a thing, the better we remember it. This is true with reference to any special acquisition: if we direct the forces of the mind upon one point, we shall necessarily give that point the benefit of the concentration, but this does not affect memory as a whole: we merely take power from one thing to give it to another. Memory at large can be improved only by increasing the vigor and freshness of the nervous system, and by avoiding all occasions of exhaustion, undue excitement, and other causes of nervous waste. We may do this by general constitutional means, or by stimulating the brain at the expense of the other functions; this last method is, however, no economy in the end. Every man's system has a certain fund of plastic power, which may be husbanded, but cannot be materially increased on the whole; the power being greatest in early life, and diminishing with advancing years. If it is strongly

drawn upon for one class of acquisitions, we must not expect it to be of equal avail for others.

But there may be ways and means of presenting and arranging the matters of our knowledge so as to make them retained at a smaller cost of the plastic power of the brain. These include the arts of teaching, expounding, and educating in general, and also certain more special devices commonly known as the arts of memory, or mnemonics. A brief account of these last may be given here.

The oldest method of artificial memory is said to have been invented by the Greek poet Simonides, who lived in the 5th c. B.C. It is named the *topical*, or locality memory, from the employment of known places as the medium of recollection. As given by Quintilian it is in substance as follows: You choose a very spacious and diversely arranged place—a large house, for instance, divided into several apartments. You impress on the mind with care whatever is remarkable in it; so that the mind may run through all the parts without hesitation and delay. Then if you have to remember a series of ideas, you place the first in the hall, the second in the parlor, and so on with the rest, going over the windows, the chambers, to the statues and several objects. Then when you wish to recall the succession, you commence going over the house in the order fixed, and in connection with each apartment you will find the idea that you attached to it. The principle of the method is that it is more easy for the mind to associate a thought with a well-known place than to associate the same thought with the next thought without any medium whatever. Orators are said to have used the method for remembering their speeches. The method has been extensively taught by writers on mnemonics in modern times. Probably for temporary efforts of memory it may be of some use; the doubtful point always is whether the machinery of such systems is not more cumbrous than helpful.

Much labor has been spent on mnemonic devices for assisting in the recollection of numbers, one of the hardest efforts of memory. The principal method for this purpose is to reduce the numbers to words, by assigning a letter for each of the ten ciphers. This method was reduced to system by Gregor von Feinaigle, a German monk, and was taught by him in various parts of Europe, and finally published in 1812. He made a careful choice of the letters for representing the several figures, having in view some association between the connected couple, for more easy recollection. For the figure 1, he used the letter *t*, as being a single stroke; for 2, *n*, as being two strokes combined; 3, *m*, three strokes; 4, *r*, which is found in the word denoting "four" in the European languages; 5, *l*, from the Roman numeral L, signifying fifty, or five tens; 6, *d*, because the written *d* resembles 6 reversed; 7, *k*, because *k* resembles two 7's joined at top; in place of this figure is also used on occasion *g*, *q*, *c* (hard) as all belonging to the guttural class of *k;* 8, *b*, from a certain amount of similarity, also *w*, for the same reason, and sometimes *v*, or the half *w;* 9 is *p*, from similarity, and also *f*, both of which are united in the word *puff*, which proceeds from a *pipe*, like a 9 figure; 0 is *s*, *x*, or *z*, because it resembles in its roundness a grindstone, which gives out a hissing noise like these letters. The letters of the alphabet not employed in representing figures are to be used in combination with these, but with the understanding that they have no meaning of themselves. Suppose, then, that a number is given, say 547; 5 is *l*, 4 is *r*, 7 is *k;* which makes *l*, *r*, *k;* among these letters we insert an unmeaning vowel, as *a*, to make up an intelligible word LARK, which remains in the memory far more easily than the numerical form. In making up the words by the insertion of the unmeaning or *dumb* letters, we should also have regard to some connection with the subject that the number refers to, as, for example, in chronology. Thus, America was discovered in 1492; the letters here are *t*, *r*, *p*, *n;* they may be made into TO RAPINE, because that discovery led to rapine by the first Spaniards. There is, of course, great room for ingenuity in the formation of these suggestive words. Also, a series of numbers may be joined together in some intelligible sentence which can be easily remembered. Such combinations, however, should be formed once for all in the case of any important series of numbers, as the dates of our sovereigns and other historical epochs. It is too much to expect pupils to construct these felicitous combinations. Feinaigle combined the topical method with the above plan in fixing a succession of numbers in the memory.

Dr. Edward Pick, a recent lecturer on mnemonics, has called attention to a peculiar mode of arranging lists of words that are to be fixed in the memory, as the exceptions to grammar rules, etc. He proposes to choose out such words as have some kind of connection with one another, and to arrange them in a series, so that each shall have a meaning in common with the next, or be contrasted with it, or be related to it by any other bond of association. Thus, he takes the French irregular verbs, which are usually arranged in the alphabetical order (which is itself, however, a mnemonic help), and puts them into the following series, where a certain connection of meanings exists between every two: as *sew*, *sit down*, *move*, *go*, *go away*, *send*, *follow*, *run*, *shun*, etc. In a case where two words have no mutual suggestiveness he proposes to find out some intermediate idea that would bring about a connection. Thus, if the words were garden, hair, watchman, philosophy, he would interpolate other words; thus, *garden*, plant, hair of a plant—*hair; hair*, bonnet, *watchman; watchman*, wake, study—*philosophy;* and so on. Of course the previous method is the one that should be aimed at, as the new words are to a certain extent a burden to the mind. Dr. Pick further suggests as a practical hint, in committing to memory, that the attention should be concentrated suc-

cessively upon each two consecutive members of the series; the mind should pause upon the first and the second until they have been made coherent; then abandoning the first, it should in the same way attend to the second and the third, the third and the fourth, etc. Of course if every successive link is in that way made sufficiently strong, the whole chain is secure.

There are various examples of effective mnemonic combinations. The whole doctrine of the syllogism (q.v.) is contained in five lines of Latin verse; as regards amount of meaning in small compass, these lines have never been surpassed, if, indeed, they have been equaled. The versification of the rules of the Latin grammar has the same end in view, but all that is gained by this is merely the help from the association of the sounds of the verse in the ear; in comparison with a topical memory, this might be called a rhythmical memory. The well-known rule for the number of days in the different months of the year ("Thirty days hath September," etc.) is an instance of mnemonic verse.

MEMORY, DISEASES OF. Memory, or the power of reproducing mental impressions, is impaired by age, wounds, or injuries to the head or nervous system, fevers, intemperance, and various physical conditions. It is perhaps affected in all kinds of mental derangement, but is in a most signal manner obliterated or enfeebled in *dementia*. There are, however, examples of recollection surviving all other faculties, and preserving a clear and extensive notion of long and complicated series of events amid the general darkness and ruin of mind. Incoherence owes some of its features to defective or irregular memory. Cases of so marvelous an exaltation and extension of this capacity, as where a whole parliamentary debate could be recalled, suggest the suspicion of unhealthy action. There appear, however, to be special affections of the faculty. It may be suspended while the intelligence remains intact. Periods of personal or general history may elude the grasp, and even that continuity of impressions which goes far to constitute the feeling of personal identity, is broken up, and a duality or multiplicity of experiences may appear to be conjoined. The converse of this may happen, and knowledge that had completely faded away may, under excitement or cerebral disease, return. There are, besides, states in which this power is partially affected, as in the instances where the numbers 5 and 7 were lost, and where a highly educated man could not retain any conception of the letter F; secondly, where it appears perverted, recalling images inappropriately, and in an erroneous sequence of order or time, and different from what are desired; and thirdly, where, while the written or printed signs of ideas can be used, the oral or articulate signs are utterly forgotten. All these deviations from health appear to depend upon changes generally of an apoplectic nature in the anterior lobes of the brain.—Crichton on *Mental Derangement*, i. 337; Teuchtersleben, *Medical Psychology*, p. 121.

MEM'PHIS, a celebrated Egyptian city, situated in the Delta, or Lower Egypt, the the ancient capital of the country, called by the Egytians *Men nefer*, or "the Good Station;" by the Hebrews, *Moph;* and by the Arabs, *Memf*. It was founded by Menes, the first monarch of the first dynasty, who, according to Herodotus, changed the bed of the Nile, and made an embankment, 100 stadia above Memphis, to protect the new city against inundations. The remains of this bank still exist at Kafr-el Tyat, about 14 m. above Metrahenny, which is the center of old Memphis, and the site of the temple of Ptah or Hephæsteum. Menes fortified the city, and laid the foundations of the temple. Uchoreus, a later monarch, is also said to have founded Memphis, and introduced the worship of Apis and Epaphus. The site of the city was well chosen, protected alike by the Libyan and Arabian chains of mountains against the river and the incursions of the sand, defending the approach of the country from the incursions of Asiatic nomads, and communicating with the Red sea and the Mediterranean. The city was composed of two portions—one built of crude bricks; the other, on which was the citadel, of calcareous stone, called the *Leukon Teichos*, or "White Wall," which held some of the principal buildings. The palace, built by Menes, was enlarged by his son Athothis, and was always inhabited either by a monarch or his viceroy. Under the Persian rule it was occupied by the satrap; and by the Greek mercenaries under the Saite kings. Under Uchoreus the total circumference was 150 stadia. After the 6th dynasty the city declined in importance, and was apparently held by the Hykshos after the 13th and before the 18th (1500 B.C.). At this period Memphis was ruled by a viceroy, a prince of the blood, and still remained the religious capital of the old worship. It rose again to great importance under the Saite monarchs, about 600 B.C., who restored it, became the seat of a separate monarchy, and was conquered by Sennacherib and his successors. The temples of this city were magnificent, and comprised the Iseum, a large temple of Isis, completed by Amasis II. just prior to Cambyses (525 B.C.); a temple dedicated to Proteus, in the foreign quarter; the temple of the Apis, having a peristyle and court ornamented with figures, opposite the south propylæum of the temple of Ptah, where the sacred bull resided; the Serapeum, or temple of Os or Apis, in the quarter recently discovered by M. Mariette (see SERAPEUM); the Nilometer, removed by Constantine I. to Constantinople, replaced by Julian III. or the apostate; a temple of Ra; and the shrine of the Cabiri. Here were the statues of Rameses II., one of which exists as the fallen colossus, Metrahenny, and others have been discovered by Hekekyan Bey in his exca-

vations. These colossi, above 75 ft. high, were of syenitic granite, or of the limestone of Tourah or Mokattam. These temples flourished in all their glory till the Persian conquest. Still more remarkable was the great necropolis of the city, in the center of which towered the pyramids (see PYRAMIDS). During the attempts of the native rulers to throw off the Persian rule, Memphis was an important strategic point. Ochus inflicted severe injury on this town, having plundered the temples and thrown down the walls after he had driven out Nectanebus. Alexander the great here worshiped the Apis, and his corpse was brought to this city by Ptolemy before it was finally transferred to Alexandria. The first Ptolemies were crowned in the serapeum. Ptolemy VIII. destroyed the city, and it had so declined after his time as to become a decayed site. It fell with the rest of Egypt under the Roman rule, and afterwards was conquered by Amru Ben Abas (639–640 A.D.); and Fostat and Cairo were built out of its ruins, which were large and important in the 13th c., when they were seen by Abd-alatif. The few remains of of the ancient city are Koum-el-Azyzeh to the n., Metrahenny on the w., and the canal of Bedrachin on the s.; but the remains here are submerged many ft. in the soil of the Delta.

Herod. ii. 97, 101, 147, 178; Diod. xviii. 34, i. 46, Fragm. t. 33, lvi. p. 184; Thucyd. i. 104; Hygin. xiv. 90; Heliod. ii. 59, 61; Hosea ix. 6; Isaiah xix. 30; Ezek. xxx. 13, 16; Wilkinson, *Top. Thebes*, p. 340; Bunsen, *Egypt's Place*, ii. p. 47; Champollion-Figeac, *L'Egypte*, 35, 63, 205, 286; Lepsius, *Reise*, 20, 51, 63.

MEMPHIS, a city and port of entry on the e. side of the Mississippi river, in the s.w. corner of Tennessee, 420 m. below St. Louis. It is handsomely built on a bluff, 60 ft. above the highest floods. It is the outlet of a large cotton region, receiving, in 1873–74, 429,327 bales. It has fine public buildings and hotels and theater, 48 churches, 3 colleges, 100 schools, 5 daily and 10 other newspapers, 10 banks, and several insurance companies; railways connecting it with New Orleans, Charleston, Louisville, Little Rock, etc.; with several foundries, manufactories of boilers, machinery, etc. In the war of secession it fell into the hands of the federal forces in 1862, and was the base of military operations for the capture of Vicksburg, July 4, 1863. Memphis was desolated by a fearful outbreak of yellow-fever in the summer of 1878. Pop. '70, 40,226.

MEMPHIS (*ante*), capital of Shelby co.; the chief city in Tennessee, and the largest city on the Mississippi river between St. Louis and New Orleans; pop. '80, 33,593. It is situated on the fourth Chickasaw bluff, 800 m. above New Orleans. The view of the city from the river is very attractive; a broad esplanade, extending along the bluff, covered with fine warehouses, presenting a very striking appearance. The streets are broad and regularly laid out, the suburbs being occupied by handsome residences standing in the midst of fine lawns; the entire length of the city is three miles. A fine park in the center is filled with large old trees, in which thousands of squirrels disport themselves, and are so tame that they will eat from the hands of visitors, clamber upon their knees and shoulders, and hop fearlessly about on the graveled walks, regardless of the numbers of persons who are commonly promenading. The safety of these attractive little creatures is amply provided for by the general understanding that they are not to be molested There are six cemeteries in the vicinity of Memphis, of which the principal one is Elmwood, on the s.e. border of the city. There is a local chamber of commerce, a board of health, and a cotton exchange. Railroads centering here make connection with all parts of the country, north and south; while the Mississippi river, affording navigation during the entire year, is the scene of an immense commerce. Owing to its proximity to stagnant water and to an imperfect system of drainage and sewerage, Memphis has frequently been subject to visitations of the yellow-fever, which have nearly depopulated the city. The last epidemic occurred in 1879, lasting from July until cold weather set in. The mass of the inhabitants deserted the city, leaving only the very poor and the colored people. During this season there were several hundred deaths by yellow-fever, an efficient quarantine being sustained. Recent and, it is said, successful efforts have been made to improve the drainage and prevent disease.

MEMPHREMAGOG, LAKE, in Canada and in Orleans co., Vermont; about 30 m. long from n. to s., with a width varying from 2 to 5 miles. Its outlet is the Magog river, which discharges into the St. Francis river, a tributary of the St. Lawrence. Its shores are steep and picturesque, and it contains a number of islands. Its scenery and facilities for fishing attract many visitors in the summer. Steamers run, in that season, between its s. point, the town of Newport, Vt., and Magog, the village at its outlet.

MEN, THE, are a somewhat remarkable class of persons found chiefly in those parts of northern Scotland in which the Gaelic language is spoken, and where large undivided parishes, a deficiency of ministers, and other causes have developed a class of religious instructors and overseers who, without regular appointment, somewhat resemble the local preachers of the Methodist church. They are called "men" as a title of respect, in acknowledgment of their mental endowments, knowledge, and piety. They pass into the order informally, and by the gradual reputation which they acquire among the people around them for superior gifts and experience. By excellence in prayer and exhortation, and by constant attendance at the meetings for promoting Christian activity and fellowship, they step by step advance into the order of "the men." There are in many parishes three or four "men;" and on communion occasions, Friday being specially devoted

to prayer and exhortation, these lay-exhorters have then a public opportunity for exercising their gifts. As there may be 20 or more of them assembled from neighboring parishes, the services of the day are given up to them, presided over by the minister of the parish, who generally sums up the opinions and sentiments that have been expressed. Many of the "men" wear on these occasions a large blue cloak, and in going about among the people they are received with much respect and kindness. The influence which they acquire is very great, and in some cases is grievously abused. Yet these constitute the exception, not the rule. There is no doubt that in many destitute regions these workers among the people have done much to keep alive and extend true religion. Since the organization of the Free church of Scotland, as the supply of regular gospel ordinances in the Highlands has been greatly increased, the need for the services of the "men" has been proportionally diminished, and their influence is therefore passing away.

MENABREA, Luigi Federigo, Count; b. at Chambéry, in Savoy, 1809; educated for an engineer; entered the army as lieut., but was early promoted to a professorship of applied mathematics in the military academy of Turin, where he at once distinguished himself by scientific essays contributed to the academies of science of Paris and Turin. In 1848 he promoted the union of Piedmont and Sardinia; was elected a member of the Subalpine parliament, appointed secretary of the minister of war, and the following year secretary of foreign affairs. After participating in vigorous measures to resist the Austrians, he continued a member of the chamber, assuming at first the defense of the church of Rome, and believing in the possible accord of the papacy with Italian unity. But, through the influence of Cavour, after 1859 he abandoned that hope, and ranged himself with the radical unionists. After the defeat of the Austrians by the French, and the annexation of Savoy to France, he left the province to retain his citizenship of Italy, and was made director of military siege operations against Gaëte and the king of Naples, in "the Sebastopol of the Bourbons." It surrendered after 57 days' siege, for which success he was made lieut.-gen. and count. In 1861 he succeeded Ricasoli as minister of marine, and in 1862 added the duties of minister of public works. He was a party to the convention between France and Austria in 1864, and of the treaty of Prague in 1866, which finally led to the annexation of Venice to Italy; and it was he who presented to Victor Emmanuel the iron crown of Lombardy. He was called in 1867, on the retirement of Ratazzi, to form a new cabinet. Garibaldi was marching upon Rome, to sever the last link in the chain of papal civil power in Italy. France opposed Garibaldi with her troops. Menabrea did the humiliating duty of endeavoring to buy the withdrawal of the French troops, and the substitution of Italian troops, by a promise to disavow the acts of Garibaldi. Occupying this equivocal position of half-sustaining the temporal power of the pope, keeping the peace with France, and yet advocating the unity of Italy, he fell between all the parties and tendered his resignation. Victor Emmanuel refused to accept it. Menabrea formed a new cabinet and continued with adroitness to pursue the road which Cavour had marked out: viz., to submit to the meddling of France in the defense of the pope till events should ripen for Italian unity. He continued at the head of affairs for two years, temporizing with the pope and the republicans, and enduring the policy of Napoleon through fear. When the pope in 1869 convoked the bishops to announce the *syllabus* of infallibility, Menabrea proclaimed the reserved rights of the state as without the pale of the pope's powers. Italy outgrew his timorous policy, and in Nov., 1869, he gave way to the ministry of Lanza-Sella. He has published *République et Monarchie dans l'état actuel de la France*, 1871.

MENA'DO, an important possession of the Netherlands, on the n. of Celebes, is under the government of the Moluccas. The country is volcanic, with many lofty mountains. The mountainous grounds of the province of Minahassa are well adapted for the growth of coffee, which was first planted in 1820, and speedily became favorably known in the market. The coffee-culture is compulsory, and the government monopolizes the produce at a fixed price. In 1874 there were 10,987,200 coffee-trees, which produced 1004 tons. The rice-crop averages 47,880 tons. There are 400,000 sago and 800,000 cocoa-nut trees, and cacao, tobacco, cotton, and cinchona are cultivated. On Jan. 1, 1875, there were 11,626 horses, 19,867 cattle, 201,284 swine, 8,641 buffaloes, and 17,169 sheep and goats. In this residency, civilization and Christianity have made rapid progress. The pop., on Jan. 1, 1873, amounted to 505,756, of whom 777 were Europeans. Twenty years ago, the pagans were most numerous in the Minahassa district, but 77,184 are now Christians. The town of Menado is neatly built, has a church, a school for the children of Europeans, and others for those of natives.

MENAGE, Ægidius, or Giles de, a French lexicographer and linguist, was b. at Angers in 1613. Disliking the profession of an advocate, he renounced it, along with an office under government, which his father had transferred to him, entered the church, and fixed his residence in the convent of Notre Dame. His time was chiefly spent in literary pursuits, in which he acquired a great reputation. He was an extreme pedant, full of prejudices and bitter hostilities. His *Dictionnaire Etymologique de la Langue Française* (Par. 1650; best ed. by Jault, 2 vols. Par. 1750), and his *Origini della Lingua Italiana*, are erudite and valuable works, although they contain many erroneous etymolo-

gies. His poems (Latin, Italian, French, and Greek) are of little worth. He died in 1692.

MENAI STRAIT, which separates the island of Anglesey from the main-land, runs e.n.e. from its southern extremity to Bangor, a distance of 13 m., and there widens out into Beaumaris bay. Its width varies from about 250 yds. to 2 miles. The navigation is hazardous, but the strait is nevertheless much used for the sake of expedition by vessels under 100 tons, and occasionally by some of larger size. At the entrance of the strait, the tides sometimes rise to a height of 30 ft., and the ordinary neap-tide rises from 10 to 12 feet. Communication between Anglesey and the main-land was formerly maintained by ferry-boats at different points; but a suspension bridge was constructed by government in the line of the great Holyhead road, and subsequently railway communication was established by means of the Britannia bridge (q.v.). The scenery on both sides of the strait is mildly beautiful.

MENANDER, the most celebrated Greek poet of the New Comedy, was b. at Athens, 342 B.C. His uncle was the comic poet Alexis; he had Theophrastus for his teacher, and Epicurus for a friend; and the influence of all three is discernible in his style of thought and feeling. Menander was a handsome, light-hearted, and elegant Greek, somewhat luxurious, but not impure in his manners. He was drowned while swimming in the harbor of the Piræus. Menander wrote more than 100 comedies, which were in high repute among his countrymen, at least after death; but we possess mere fragments of them. We know something of their character, however, from the imitations of them by Terence. Pleasant and refined wit, clear, sententious reflection, and a vein of real earnestness at times, are the qualities most apparent in them. The best edition of the extant fragments of Menander is Meineke's *Fragmenta Comicorum Græcorum* (Berl. 1841).

MENARD, a co. in central Illinois, along the Sangamon river, which with Salt creek forms its n. boundary; 300 sq.m.; pop. '80, 13,028. The surface is level, with considerable growth of wood. The soil is fertile, and produces oats, Indian corn, hay, wheat, and potatoes. The Chicago and Alton, and the Springfield and Northwestern railroads pass through it. Co. seat, Petersburg.

MENARD, a co. in n. central Texas, along the shores of San Saba river; 800 sq.m.; pop. '80, 1239. The soil is fertile, and there is a considerable growth of wood. The principal production is cattle. It is a good grazing country, which, as yet, has been little opened to cultivation. Co. seat, Menardville.

MENARD, RENÉ, 1604–61, b. in Paris; sent to Montreal as a French Jesuit missionary in 1640; thence to the Nipissings n. of the lakes; afterwards at Three Rivers. He was at Cayuga in 1656, at Oneida soon afterwards, and remained with the Indians when personal violence and death to the missionaries was frequent among them. In 1658 and 1660 he was with the Ottawas of lake Superior, by whom he was not well treated. His last station was in 1661 at St. Teresa's on Keweenaw bay.

MENASH'A, a village of Winnebago co., Wis., on the Chicago and Northwestern, and the Wisconsin Central railroads, 18 m. n. of Oshkosh; pop. of village, 2,484; of township, 3,107. It has a weekly newspaper, a national bank, and several manufactories.

MENAS'SEH BEN ISRAEL (MANASSEH BEN JOSEPH BEN ISRAEL), 1604–59, b. Spain; went to Holland, when young, with his father, to escape the inquisition. There he was educated, and when but 18 years old succeeded his tutor, the rabbi Uziel, as expounder of the Talmud, and preacher in the Amsterdam synagogue. He now began his *Conciliador nel Pentateucho*, which appeared in 1632, and secured for its author a high rank among Hebrew theologians. A Latin translation of it, by Dionysius Vossius, was published the next year, under the title of *Conciliator*.

MENDÆANS. See CHRISTIANS OF ST. JOHN.

MENCHIKOW, or **MENCHIKOFF**, ALEXANDER DANILOVITCH, a Russian field-marshal and minister of state, was b. at Moscow on Nov. 28, 1672. He was a baker's apprentice, when his intelligent countenance attracted the notice of gen. Lefort, through whose patronage he was taken into the service of Peter the great. He had the good fortune to discover a conspiracy among the czar's guards, and his rapid promotion was secured. He accompanied Peter in his travels to Holland and England, and on the death of Lefort was raised to the post of chief adviser. Menchikow was one of the greatest men of his time, excelling equally as a gen. and a diplomatist; and although totally uneducated, he did much to promote the education of the people, and was a liberal patron of the arts and sciences. On Oct. 30, 1706, he defeated the Swedes at Kalisch; he contributed to some of the czar's other victories; was made a field-marshal on the field of Pultawa; and compelled Löwenhaupt to capitulate with great part of the Swedish army. In 1710 he took Riga; in 1713 he led the Russian troops into Pomerania and Holstein, and took Stettin, but gave it up to Prussia, contrary to the will of the czar. This and his avarice so displeased Peter that he subjected him to a court-martial. He was condemned to death by a majority of voices; but was pardoned on payment of a heavy fine. During the reign of Catharine I. he regained

his influence at court, and, after her death, governed Russia with almost absolute authority in the name of Peter II., whose father-in-law he was just about to become, when he was overthrown by Dolgorouki, and banished to Siberia (Sept., 1727). His immensee states and treasures were confiscated. He died Oct. 22 (Nov. 2) 1729. His great-grandson, prince ALEXANDER SERGEJEVITCH MENCHIKOW, was b. in 1789, and after being long an attaché of legation at Vienna, served in the campaigns of 1812–15, rose to the rank of gen., and after the accession of the emperor Nicholas, was employed both in diplomatic and military services. In the Turkish campaign of 1828 he took Anapa after a short siege, but received so severe a wound before Varna as compelled his retirement. He was afterwards for a time at the head of the Russian navy, and raised it to a high state of efficiency. In March, 1853, he was sent as ambassador to Constantinople, where his overbearing behavior produced a speedy rupture between the porte and the czar, and brought about the Crimean war. In this war he commanded both the land and naval forces of Russia, and displayed the utmost energy in defending Sebastopol. In March, 1855, he was appointed commander of Cronstadt. Menchikow was till his death in 1869 one of the most prominent members of the old Russian party.

MENCIUS. See MENG-TSE.

MENDA'ÑA DE NEY'RA, ALVARO, 1541–95; b. in Spain; emigrated to Peru, and had resided some time at Lima, when his uncle, Lope Garcia de Castro, the viceroy of the country, put him in command of an expedition for purposes of discovery among the islands of the Pacific. With two small ships and 125 men he sailed from Callao Nov. 19, 1567. Among his discoveries was a group of islands which he named "Solomon islands," thus indicating his belief that Solomon obtained from them the gold used in the temple at Jerusalem. Returning to Lima in 1568 he circulated reports of the wealth of these islands, which led, 27 years later, to an expedition for their colonization, of which he took the command. Sailing from Callao April 11, 1595, he discovered another group of islands, which he named the Marquesas, after the wife of the viceroy of Peru, the marchioness Mendoza. Sailing n.w., other groups of islands were visited, but Mendaña died in October without having reached the end of his voyage, which, however, was completed by his widow. Mendaña's narrative of his first expedition is in the imperial library at Paris.

MENDAÑA ISLANDS. See MARQUESAS, *ante*.

MENDE, a town of France, capital of the department of Lozère, on the Lot, in a valley surrounded by high hills, about 70 m. n.n.w. of Montpellier. In the vicinity are numerous villas and gardens. Mende has a cathedral surmounted by two spires, and manufactures serges and other coarse cloths. Pop. '76, 6,239.

MENDELSSOHN, MOSES, an eminent German philosopher, was b. Sept. 7, 1729, at Dessau. From his father, a Jewish schoolmaster and scribe, he received his first education; and in his 13th year proceeded to Berlin, where, amid very indigent circumstances, he contrived to learn Latin and modern languages, and to apply himself to the study of philosophy, into which early readings, chiefly of Maimonides's *Moreh Nebuchim*, had initiated him already. After many years of comparative indigence he became the partner of a rich silk-manufacturer, whose children he had educated. The intimate friend of men like Lessing, Sulzer, Nicolai, he, directly and indirectly, contributed in a vast degree to the extermination of the brutal prejudices against the Jews, and the disgraceful laws with respect to them. On the other hand, he acted in the most beneficial manner on his own co-religionists, by rousing them from the mental apathy with which they regarded in his day all that had not a distinct reference to religion, and by waging fierce war against their own religious and other prejudices. He was also, on account of his immense influence upon them, called another Moses. He died Jan. 4, 1786, and Ramler wrote the following epitaph on him: "True to the religion of his forefathers, wise as Socrates, teaching immortality, and becoming immortal like Socrates." His principal works are, *Pope, ein Metaphysiker* (with Lessing) (Dan. 1755); *Briefe über die Empfindungen* (Berl. 1764); *Ueber die Evidenz der Metaphysischen Wissenschaften*, a prize essay of the Berlin academy, which thereupon unanimously resolved to elect him a member of their body; Frederick the great, however, generally prejudiced against the Jews, struck his name off the list; *Phaedon, oder über Unsterblichkeit der Seele* (Berl. 1767) a dialogue in the manner of Plato; *Jerusalem, oder über religiöse Macht des Judenthums* (Berl. 1783), chiefly in answer to Lavater's obtrusive, sometimes even offensively worded arguments, by which he intended to convert Mendelssohn to Christianity, or to prove that he was a Christian already. Further, *Morgenstunden* (Berl. 1785)—morning conversations with his children and friends, chiefly in refutation of Pantheism and Spinozism. Besides many other smaller Hebrew and German essays, contributions to the *Bibliothek der schönsen Wissenschaften*, edited by Lessing (to whom, in a manner, he furnished the prototype to his *Nathan der Weise*), etc., his translation of the Pentateuch and the Psalms deserves a prominent place. His works have been collected and edited by G. B. Mendelssohn (Leip., 1843–45, 7 vols.).

MENDELSSOHN-BARTHOLDY, FELIX, a German musical composer, son of Abraham Mendelssohn-Bartholdy, the eminent banker, and grandson of Moses Mendelssohn, the philosopher, was b. at Hamburg, Feb. 3, 1809. His father was a convert to Christianity,

and young Felix was brought up in the Lutheran faith. The affluent circumstances of his parents enabled them to bestow a most liberal and careful education on their son, whose fine genius early showed itself. Zelter was his instructor in composition, Ludwig Berger on the piano. In his ninth year he gave his first public concert in Berlin, and in the following year played in Paris. From this period he commenced to write compositions of all sorts, some of them of a very difficult character, for the piano, violin, violoncello, etc. In 1824 the first of these—three quartets for the piano—were published. In 1825 he went a second time to Paris—his father, on the advice of Cherubini and other eminent artists, having consented that he should devote himself exclusively to music. He now gave concerts both in Paris and Berlin, after which he traveled for three years in England, Scotland, France, and Italy. In the first of these countries he obtained enthusiastic applause by his overture to Shakespeare's *Midsummer Night's Dream*, which, in its blending of the fanciful, the delicate, and the grotesque, is said to have caught the inspiration of Shakespeare himself. He afterwards wrote music to accompany the whole of the play. His *Isles of Fingal* is a fine memorial of the impression left upon him by the wild scenery of the western Highlands. His letters from Italy also show how profoundly he was affected by that glorious land—the true home of art. Mendelssohn subsequently attempted to start a musical theater for the cultivation of high art, at Düsseldorf, but it did not succeed. In 1835 he accepted the directorship of the Leipsic concerts. Here he was in the center of the musical world of Germany, and was stimulated to his highest and most brilliant efforts; yet it was in England that Mendelssohn first met with a reception proportionate to his genius. His oratorio of *St. Paul*, after being performed at Dresden and Leipsic, was produced under his own management at the Birmingham festival, Sept. 20, 1837, and created quite a furor. It and his other oratorio of *Elijah*, on which he labored for nine years, and which was first brought out at the Birmingham festival of 1846, are reckoned his two greatest works. He died at Leipsic Nov. 4, 1847. Among his best-known compositions are his music for Goethe's *Walpurgisnacht*, the *Antigone* and *Œdipus* of Sophocles, *Athalie*, and a great number of splendid sonatas, concertos, trios. In his *Leider ohne Worte* (songs without words), he has achieved a great and novel triumph. Mendelssohn's character, which was even finer than his genius, is charmingly delineated in his *Letters* which have been translated from the German by lady Wallace (London, 1862).

MENDES, a city of ancient Egypt in the delta Parvum, and near the coast. It gave name to the Mendesian district, and was its chief city. It was near the point where the Mendesian arm of the Nile enters the lake of Tanis. It was a place of importance in the time of the Pharaohs, and noted for the manufacture of a perfume called *Mendusium unguentum*. The deity there worshiped was in the form of a goat, and called Pan by the Greek writers. Mendes gradually disappeared from history, being in ruins in the 1st c. B.C., but in its vicinity arose the city of Thmius.

MENDEZ-PINTO, FERNAM, 1510-83, b. Portugal; at first a servant to a gentleman in Portugal. He sailed for the East Indies in 1537, in the hope of making a fortune. The ship on which he embarked was captured by the Turks, and he was sold a slave. Finally, by the good offices of the governor of Ormus, who had redeemed him from slavery, he was enabled to go to India, where he remained for many years. He returned to Portugal, in 1558. He wrote an account of his travels, which was published in 1614, and translated into French in 1654. It contains much curious information in regard to the geography and social condition of the east; but it indicates great credulity or a want of veracity on the part of its author.

MENDICANCY. (See POOR AND POOR LAWS, *ante*.) Mendicants are practically all persons who gain a livelihood by beggary; a definition excluding those who are willing to work but cannct, owing to lack of demand for labor; and those who temporarily receive assistance because of ill-health or other misfortune. The class we are considering does not exist in uncivilized or savage society. Yet among the least highly civilized we find it flourishing—as in Egypt, and in the case of the lazzaroni of Italy. In large cities mendicancy has become an art, and professional beggars are found in London, Paris, and New York, who have amassed large sums of money by the constant pursuit of a trade which with them has ceased even to be precarious. While we may possibly, with some degree of justice, find the origin of professional beggary in the course not only pursued by, but enjoined upon the orders of, mendicant friars in central and southern Europe, it is certain that the concentration of wealth, the decline in the value of money in the minds of those by whom it has been easily obtained, and the consequent habit of lavish giving, must eventually have brought this condition into being, even though the church had not encouraged its establishment. Twenty-five years ago (1855) it was said by an English writer that a three days' rain about London would at any time bring 30,000 coster-mongers, or venders of provisions, to the verge of famine. This is suggestive. The precarious character of the vocation of many of the lower classes of laboring people, and the imminent danger in which they constantly are, must be a grave temptation to the pursuit which we are considering. In thickly settled towns and cities the chances of gaining the necessities of life are certainly greater in this line than in many trades. It is not liable to the fluctuations occasioned by fashion, or changing taste; by the influence of the seasons; or by the other numerous

vicissitudes which deprive ordinary trades of the element of certainty of return. The professional beggar is not limited to any special range, but may vary his hunting-ground by necessity, caprice, or accident, and be equally certain of success. Also there are peculiar attractions in mendicancy for the uneducated and unskilled, yet not lawless portion of a population, in its comparative freedom from restraint; its opportunity for roving, and for a wild companionship with congenial spirits, precluded by the social order of a regular business life; and, finally, the charm and satisfaction which it offers, of gaining something for nothing; of living on humanity without labor yet without crime; of satisfying the stern natural sense of justice which exists in the bosom of the unfortunate and the indigent, by making the rich support the poor—yet without compulsion. It may also be considered as one of the compensating forces of the social organism, occasioned by the reaction from extreme wealth to extreme poverty, and formulated in an unreasonable demand, answered by a groundless concession; in fact a humanitarian paradox.

The difficulty of dealing with poverty justly, and with a due sense of its various causes and results, has been a social problem ever since there has been any society; and quite the most difficult part of this problem to handle wisely, or to control at all, has been mendicancy. The same English writer to whom we have already referred, in writing generally on the charities and poor of London, says: "But the great problem which perplexed our ancestors less than ourselves, only because in a less crowded state of society social evils were more easily dealt with, was mendicancy. In every community there must always be some who cannot dig, and in the most primitive there are always some who will not, and are not ashamed to beg. From the earliest times the sturdy mendicant has constituted himself the representative of the poor, in whose behalf the Gospel pleads so authoritatively. In that character he lounged at the convent-grate, he devoured his dole at the baron's hall-door, he clamored for alms at the church-porch, and in that capacity we presume he is accepted by the modern advocates (happily few in number) of indiscriminate alms-giving. But even in the most picturesque times, when he pretended to show the scallop-shell from the holy land in his hat, or perhaps the scars of infidel sabers on his body, he was but a good-for-nothing vagabond." The enactment of the poor-law in queen Elizabeth's reign has been attributed to a necessity occasioned by the dissolution of the convents, which were supposed to feed the poor to such an extent as to make the necessity when they ceased to exist. That this was not true is shown by the fact that acts for the suppression of mendicancy were passed before the dissolution of the monasteries. The act of Elizabeth was passed from a desire to effect a social reform, and similar acts were passed in succeeding reigns down to the present, and for the same reason. But though from time to time acts against able-bodied paupers were multiplied, the vagrant continued to prefer idleness and independence to work or the poor-house, and by degrees the number of beggars swelled, till they exceeded the powers of the beadle and constable to arrest, and of the jail or poor-house to contain, and actually acquired an almost legalized existence. At the close of the great European war the evil had reached its height; ostentatiously loathsome objects paraded the great thoroughfares; professional beggars, by a police of their own, quartered the towns among them, and in 1818 an association was formed in London to accomplish what the state had failed in doing. This organization took the name of the society for the suppression of mendicity. A large staff of paid agents was engaged, and the committee for its management counted among its members many naval and military men, trained to habits of order and system; and who, being without professional employment, brought their administrative talents to the service of the new society. This organization did good work, and was the foundation of methods which have since been applied with success; and mendicancy has largely diminished. The reform movement in England in 1834, and new legislation, still further lessened the evil; yet so acute and well informed an observer as the rev. Charles L. Brace says that "the conclusion of all European experience is that nothing can permanently affect the evil of mendicity but a general diffusion of prosperity, morality, and intelligence," certainly affording a gloomy outlook for the future, both in Europe and America; since concentration of wealth, rather than its diffusion, seems to have become the order of society; and the probability of general "prosperity, morality, and intelligence," in the face of that tendency, is, to say the least, remote.

The theory held by many that pauperism bears a direct relation to the price of corn would seem to have been practically disposed of by the statistics of the sums expended in relief from 1813 to 1860 in England. By these it is seen that while there was a steady decline in the amount from about £6,650,000 in 1818 to £5,550,000 in 1859, the difference of 20 per cent was far less than it should have been to sustain the theory. For the price of corn had fallen during the 46 years, from 125s. per quarter to 42s. 9d., or sixty-six per cent. And this fact goes far to sustain the assertion that pauperism, and equally or even more, mendicancy, rely for their fluctuations in degree upon causes outside of all such material considerations.

The history of mendicancy in France attests the antiquity of the profession, and offers some pertinent facts. Thus, as early as the middle of the 14th c., in the reign of king John, it was found necessary to issue an ordinance commanding all able-bodied beggars to find work or leave Paris, with the alternative of imprisonment, the pillory, and brand-

ing, according to the number of offenses against the law. A similar act was passed in 1413; but Francis I. rescinded both, and instead directed the public authorities to set those persons indicated to work, if necessary by force. But it was found that severe laws had but little effect in suppressing the evil; and though in 1627 beggars were directed to be impressed into the naval service, and even expatriated by being sent to the Indies, work-houses were established in France, and thus a new system was begun. In 1688, all previous plans having failed, a law was enacted forcing every beggar to leave Paris, on pain of being sent to the galleys. Even this harsh measure was incompetent to relieve the city of mendicants, much less the entire kingdom; and in 1698 it was estimated that one-tenth of the entire population were beggars. The work-house plan was now tried again, and in four years 80 of these were established. These institutions not only did not succeed in rooting out the evil, but they were found to be, instead of self-supporting, as was anticipated, a severe tax on the state. They were gradually suppressed, and at present very few exist. Mr. Brace remarks as to the various French methods: "Thus, during five centuries every species of penalty and punishment has been tried in vain in France to repress mendicity. Humane legislation has been equally a failure; and the sum of all experience in that country is that all legal means fail to reach this great evil." But the fact is that there is less mendicancy, as there is less pauperism in France, in proportion to its population, than there is in any other country in Europe, or in the United States. And it would appear that to seek for the cause of this fortunate condition we must analyze the effect of the French land laws. For the fact that in France, where there is no law of entail for landed property, and where a father cannot by will alienate this species of property in any one direction; but where, on the contrary, land is divided among all the heirs, on the death of the owner,—there must of necessity be such a subdivision of land that the existence of pauperism on a large scale becomes practically impossible: the result being that the land is divided among a larger number of owners than is the case with any other country. Another and curious reason for the condition of France as regards pauperism is found in the fact of the apparently stationary condition of her population. Between 1851 and 1876 the population increased only about 3 per cent, and was nearly what it was in 1870. The birth-rate in France is only 26 in a thousand, being far below that of any other country. An ingenious Frenchman bases on this condition the positive prosperity of his country, on the ground that the number of non-producers is lessened, and so much less drain on the resources of the country for their support is the result.

The record of pauperism and mendicancy in the United States has been similar to that of England in its general conditions. The class of beggars in the large cities and towns has been supplemented by that of "tramps." These are comparatively recent in their origin in the United States; and it is not improbable that they were originally an exportation from England, where they have long been a feature of pauperism. They have increased greatly in number in recent years, and in Massachusetts alone there were said to be a few years ago 25,000 of these peripatetic beggars. It is certain, also, that they are to a certain extent organized, that they associate with each other, and that they communicate by signs and marks placed where they can be found by the initiated. The proportion in Massachusetts applied to the entire population would give 750,000 as the number of tramps in the entire country, or one in 66. In England, in 1867, the number of tramps was returned, on a certain specified night, at 33,191—very little more than the number in Massachusetts alone, and in the proportion of 1 to 666. Various efforts have been made in the United States in the special direction of reducing the number of tramps, culminating in the passage of severe "tramp laws" in Massachusetts and a few other states. These laws are of very recent enactment, and their effect has not yet been made known. It is probable that unless similar legislative action took place in all the states the effect would be only to drive them from one state to another.

MEN'DICANT ORDERS, certain religious associations in the Roman church, which, carrying out the principle of religious poverty and self-humiliation to its fullest extent, make it a part of their profession to denude themselves of all property, whether real or personal, and to subsist upon alms. As the scriptural foundation of this practice, the words of our Lord (Matt. xix. 21) to the young man who sought counsel of him, and again (verses 27–30) to his own disciples, are commonly alleged, both by the mendicant orders and in general by all who profess what is called evangelical poverty. In the mendicant orders alms are commonly collected by the lay-brothers; in some, by actual solicitation; in others, by the ringing of the convent bell when the stock of provisions is exhausted. Formerly such orders were numerous in the church; but by a decree of the second council of Lyons in 1274 the mendicant orders were limited to four—the Dominicans, Franciscans, Carmelites, and Augustinians or Austin friars. See these articles, also FRIARS. The rule by which individuals are denied the possession of even personal property is strictly understood in Catholic countries. In England and Ireland it was considerably relaxed, but of late years has been enforced with increasing exactness.

MENDIP HILLS, a range in the northern part of Somersetshire, England, extend in a n.w. and s.e. direction, and are about 25 m. in length by from 3 to 6 m. in breadth. In former times the moors of Mendip were attached to the crown as a royal forest, and were frequently hunted over by the Saxon and Norman kings. A considerable portion

of the range is now under cultivation. The summit is Black down, 1100 ft. in height. The lead and calamine mines of Mendip (called *grooves*, the miners being called *groovers*) were in operation before the dawn of history.

MENDIZABAL, JUAN ALVAREZ Y, 1790–1853; b. in Cadiz; son of a Jew, brought up in trade, placed in a bank, where he quarreled with the principal, and first noted as a politician in connection with the republican movement in Spain between 1819 and 1823; for which he obtained in England timely loans. In 1824, banished from Spain, he established a commercial house in London; was the medium of a loan to Dom Pedro in 1827, to Spain in 1833, and was recalled in 1835 by Toreno to take charge of the department of finance. He returned to Spain with the *éclat* of a completed loan of £1,150,000, made in London. After great boasts of what he would do, followed by small results, he was displaced in May, 1836, and, though twice called back to the portfolio of finance, was not afterwards distinguished.

MENDOCI'NO, a co. in n.w. California, having the Pacific ocean for its w. boundary, the Mayacmas mountains for its s.e., and the continuation of the Shasta mountain range for its e. boundary; 3,650 sq.m.; pop. '80, 12,800—10,393 of American birth, 1613 colored. It is drained by the Eel river and the South Fork in the e., the Russian river in the s., and the Novarro river. Its surface is mountainous, furnishing good grazing pastures, and is diversified by lakes, fertile valleys, and immense forests of redwood, used for building-timber, grow along the coast. Its soil is very fertile, and adapted to the production of grain, fruit, and dairy products. Horses and cattle are raised, and large numbers of sheep. Wool and lumber are the chief products. It has several excellent harbors. County seat, Ukiah.

MENDO'TA, a village of La Salle co., Ill., at the junction of the Chicago, Burlington and Quincy, and the Illinois Central railroads. Pop. of village, exclusive of township, 1043. It has 2 churches, 2 graded public schools, a library, 2 banks, an iron foundry, an organ manufactory, and a weekly newspaper.

MENDOZA, a province of the Argentine confederation, South America, along the e. of the Andes, bounded on the n. by the province of S. Juan, on the e. and n.e. by S. Luis, on the s. and s.e. by Buenos Ayres, and on the w. by Chili; about 34,000 sq.m.; pop. about 65,000. The w. part of the province is traversed by a part of the Andes chain, from which the surface slopes down to the Mendoza river, at which a great plain begins to stretch eastward. This plain is sandy, but with proper irrigation produces good crops of barley, maize, wheat, and lucerne. Apart from the cereal crops the chief productions are wines, brandy, tallow, and soap. Hides and dried fruits are exported to Chili. There are a few silver mines, and copper is known to exist in quantities, but the veins have not as yet been worked. There are extensive saline deposits; and shales, slates, gypsum, and limestone are found. Rain and dew are infrequent, except along the s. boundary; elsewhere artificial irrigation has to be resorted to, as even grass will not grow on the e. plains without it. Mendoza is one of the federal states of the Argentine republic, but practically manages its own affairs by means of a governor and an assembly. The capital of the province is Mendoza, built on a plain, 2,891 ft. above the level of the sea. Pop. about 10,000.

MENDO'ZA, the capital of a department of the same name in the Argentine republic (q.v.), is situated on the eastern base of the Andes, 110 m. e.n.e. of Santiago, and at a height of 2,891 ft. above sea-level. It was totally destroyed by an earthquake in 1861, when its buildings were demolished, and most of its inhabitants, 15,000 in number, perished; but it is rapidly recovering.

MENDOZA, ANTONIO DE, 1495–1552; b. Granada; was appointed viceroy of México by Charles V. April 17, 1535, invested with full power of rule. In the administration of the government he made many wise and benevolent reforms, especially in regard to the Indians who had been the victims of much suffering. In 1536 he introduced into the city of Mexico the first printing-press brought to the country; established a mint, at which the first coining, in the same year, was done by his orders; promoted agriculture and developed the mining wealth of the land, and founded the first college there. He repressed a serious Indian revolt, wisely tempering rigor with justice. In 1551 he was transferred to the viceroyalty of Peru. He was the first of 64 viceroys in Mexico, and his government was the longest and most distinguished of all.

MENDOZA, DON DIEGO HURTADO DE, a Spanish classic, distinguished also as a statesman and a gen., was b. at Granada about 1503, studied there and at Salamanca; and shortly after leaving the latter university was sent by the emperor Charles V. as ambassador to Venice. Later, he was present at the council of Trent as imperial plenipotentiary, and in 1547 was appointed ambassador to the papal court. As a gen., he was successful in subjugating Siena, which was handed over to Cosmo I. Medici, as a fief of the Spanish crown. His position, however, was a difficult one; he was hated both by pope and people, and in 1554 the emperor recalled him. During his residence in Italy he showed the greatest zeal in collecting literary treasures, especially ancient MSS. He sent learned men for that purpose to Mount Athos, and also took advantage of the regard entertained for him by Soliman the magnificent, sultan of Turkey. In 1568 an affair of gallantry terminated in his banishment from court. He withdrew to Granada, where he

spent his last years in writing his *Guerra contra los Moriscos* (history of the war against the Moors—first published—with parts omitted—in 1610, and in a complete form in 1776, by Portalegre, who prefixed a life of the author). This work is regarded by Mendoza's countrymen as a masterpiece. Mendoza died in 1575. His library is now one of the ornaments of the Escurial. In his poetical epistles he gave his country the first good model for that form of composition. His sonnets and serious poems are of inferior merit.

MENDOZA, IÑIGO LOPEZ DE, Marquis of Santillana, 1398–1458, b. Spain; son of the grand admiral of Castile, and grandson of the poet Pero Gonzalez Mendoza. His father died during Iñigo's infancy, and the family estates, the most extensive in Castile, were seized by the ruling nobles of the kingdom. But Iñigo recovered them, either in the courts or on the field, before he was out of his minority. He took a prominent share in the military and political affairs of Castile, and was created marquis of Santillana after the battle of Olmedo. After the fall of the constable Alvarado de Luna, Mendoza retired from public affairs, and devoted himself to literature. His poetry is largely unpublished, though some of it is contained in different collections of songs. He was familiar with Italian and Provençal literature, and many of his most charming poems show the effect of Provençal influence. He introduced the sonnet into Spain, but his own sonnets are of little value. He imitates Dante, in his poems on the death of the marquis of Villena and on the coronation of Jordi. The most important of his poetical works is the *Comedieta de Ponza;* his most pleasing poem is called a *Serranilla,* or little mountain song, and was composed in honor of a little shepherdess, "the milkmaid of sweet Finojosa." In Spain itself his *Refranes,* a collection of rhymed proverbs, is his most popular work. His principal though perhaps doubtful service to Spanish poetry was his introduction of allegory into poetical composition.

MENDOZA, JUAN GONZALES DE, 1540–1617; b. Toledo, Spain; of a wealthy and distinguished family. He joined the army, but resigned after some years to enter the order of St. Augustine; was sent by Philip II. to China in 1580, where he spent three years in gaining information as to the politics, commerce, manners, and customs of the country. He spent two years in Mexico before returning to Spain. He published an account of his observations in China in a work entitled *Historia de las Cosas mas Notables Ritos y Costumbres del Gran Reyno de la China.* An English translation appeared in 1588, and it was reprinted by the Hakluyt society in 1853–54. Father Mendoza was successively bishop of the Lipari islands, vicar-apostolic of Mexico, and bishop of Chiapas and of Popayan, New Granada, where he died.

MENDOZA, PEDRO DE, 1487–1537, b. Spain; an official in the service of Charles V. In 1535 he went on a voyage to South America for the purpose of exploring the south of that continent, and with authority to take possession of and colonize it in the name of Spain. Made governor of the territory he was to conquer, he left Spain with a fleet of 12 ships, containing 800 men. At Rio Janeiro, Osorio, the vice-admiral, was murdered by some of his subordinates. Mendoza then sailed up the Rio de la Plata, and laid the foundations of the city of Buenos Ayres, where he established a colony. His brother, Gonzalo, went to Paraguay and founded Asuncion in 1536. The colony at Buenos Ayres did not prosper from the first. Aside from the privations to which the colonists were exposed, and the mortality incident to a community not yet accustomed to a new climate, the settlement was constantly attacked by the neighboring Indian tribes, and brought to the verge of destruction. Mendoza, after many disappointments, died on his voyage back to Spain.

MENELA'US, in ancient Greek legend, was king of Lacedæmon, the younger brother of Agamemnon, and husband of the famous Helen. The abduction of his wife by Paris is represented as the cause of the Trojan war. After the fall of Troy he sailed with Helen for his own land; but his fleet was scattered by a storm, and he wandered for eight years about the coasts of Cyprus, Phenicia, Ethiopia, Egypt, and Libya. After his return he lived at Sparta with his wife Helen in great style and happiness.

MENENDEZ DE AVILES, PEDRO, 1519–74; b. at Aviles, Spain. Educated to the sea, he for many years commanded a privateer which was the terror of the French corsairs. By Philip II. he was given a commission in the regular navy and made capt. gen. of the India fleets. In this position he won important victories over the pirates, and was of great service in successfully transporting to Philip the reinforcements which carried the day at the battle of St. Quentin. On June 29, 1565, he sailed from Cadiz with a fleet of 34 vessels with the intention of founding a colony in Florida, of which he had been appointed *adelantado.* The French Huguenots had already established a foot-hold near the mouth of the St. John's river, under the leadership of Ribault. The Spaniards were by far the most powerful in numbers and equipments, and in the ensuing contest the main French stronghold, fort Caroline, was captured, many of the colonists were massacred, and when those who had escaped to the ships of Ribault were wrecked and in a starving condition, Menendez received their surrender, promising to spare them; but, with a treachery and cruelty almost beyond belief, violated his plighted word and slew nearly all of them. Many were hanged and left bearing inscriptions stating that they were killed "not as Frenchmen, but as heretics." When, soon after, the atrocity

was avenged by the French adventurers under Dominique de Gourgues, the Spaniards were hung upon the same trees, with placards stating that they were executed "not as Spaniards, but as cut-throats and murderers." It was in this expedition that St. Augustine was discovered and named. Other posts were established by Menendez further up the coast, as at cape Canaveral and Port Royal. Menendez returned to Spain, but still controlled the affairs of the new colonies. In 1572 he again visited the western continent and carried his explorations still further. He was recalled and ordered to the command of a fleet to be employed in the war with the Low Countries; but died at Santander while engaged in fitting out his vessels.

ME'NES, the first king of the first Egyptian dynasty, who built Memphis, made foreign conquests, introduced luxury, and was subsequently devoured by a hippopotamus. During his reign there was a revolt of the Libyans. His name marks a great chronological epoch, being placed by chronologists 3643, 3892 B.C., or even 5702 B.C. Stricter chronologists make his accession 2717 B.C. This name, which signifies the conductor, has been found on inscriptions, but no contemporary monuments of him are known.—Bunsen, *Egypt's Place*, ii. p. 579; Lepsius, *Königbuch, quellentaf.*, p. 5; Böckh, *Manetho*, p. 386; Poole, R. S., *Hor. Ægypt*, p. 219.

MENFI, or MENFRICI, a t. of Sicily, in the province of Girgenti, 43 m. s.s.w. of Palermo, crowns a long bare height, about 3 m. from the coast. Pop. 9,900.

MENGS, ANTON RAFAEL, a modern German artist and writer on art, b. at Aussig, in Bohemia, Mar. 12, 1728. His father, Israel Mengs, was himself a painter, but possessed of very mediocre talent, and from him young Rafael received his first instructions in art. At the age of thirteen he went to Rome, where he remained three years, rigorously devoting his whole time to the study of the works of Michael Angelo, Raphael, and others of the old masters. On his return to Dresden in 1744 he was appointed court-painter to Augustus III., king of Poland and Saxony, but received permission at the same time to go back to Rome. Here he established his reputation by a picture of the "Holy Family." The young peasant-girl who sat for the Virgin so charmed the painter by her beauty that he subsequently passed over to the Roman Catholic church, and married her. In 1754 he accepted the presidency of the newly instituted academy of painting at Rome. Within the next few years he executed the frescos in the church of San Eusebio, and those of "Apollo and the Muses on Parnassus" for cardinal Albani; besides which he copied Raphael's "School of Athens" for lord Percy, and painted several original pictures in oil, among which may be mentioned a "Cleopatra," a "Holy Family," and a "Magdalene." In 1761 he went to Madrid, on an invitation from Charles III. of Spain, and while there executed a great variety of works, the best-known of which is his "Aurora;" but ill-health and the intrigues of enemies induced him to return to Italy. He had no sooner arrived than Clement XIV. employed him on a large allegorical subject for the Vatican library, representing Janus dictating to History, who appears in the act of writing. After three years he again visited Spain. To this period belongs his most celebrated effort; it represents the apotheosis of the emperor Trajan, and is executed on the dome of the grand saloon in the royal palace at Madrid. Ill-health, however, again forced him to leave Spain. On his way back to Italy he stopped at Monaco, where he painted his picture of the "Nativity," reckoned by many to be his finest piece. Shortly after reaching Rome he died, June 29, 1779. Mengs's works are careful and elaborate imitations of the great masters. He borrowed the technical qualities of a painter in high perfection, but the living soul of genius, the quickening and creative power of imagination, was not his. His works, therefore, though lofty in their subjects, seldom exhibit more than a correct and cultivated taste. Mengs's writings were edited in Italian by Azara in 1780. There is an English translation (Lond. 1796).

MENG-TSE (i.e., the teacher Meng; earlier, MENG-KO; Latinized by the Jesuits into MENCIUS), a Chinese sage, b. in the beginning of the 4th c. B.C., in the village of Tséou, in the present district of Shan-tung. He died about 317 B.C. Meng-tse is the greatest of the early Confucians. His father died while Meng-tse was very young; but he was educated with such admirable care by his mother that the phrase "mother of Meng" has become a proverb for an excellent preceptress. At this period China was divided into a number of states, all acknowledging the suzerainty of the emperor of Tseu. Meng-tse traveled to several courts, seeking to introduce his doctrines of "virtue" and "justice;" but unfortunately, as too frequently happens, he found that princes and great men did not admire these things so much as poor scholars. His conversations with rulers and state-functionaries, with his disciples and acquaintances, were taken down by his admirers. They form the *Hi-tsi*, otherwise called the book of Meng-tse—the fourth of the Four Books. See CONFUCIUS. Many of the thoughts are exquisitely true, suggestive, and subtle. Several translations of it have been published, but they fall far short of the energy, sententiousness, freshness, and vivacity of the original. One of the best is the Latin version of Stanislas Julien, 12 vols. (Paris, 1824). There is also an English one by Collie (Malacca, 1828), and another by Pauthier (Paris, 1851).

MENHA'DEN, *Alosa menhaden*, a fish of the same genus with the shad (q.v.), which is caught in great quantities on the coasts of New York and New England during the summer months, when it visits them for the purpose of spawning. Its length is from 8

to 14 inches; the color of the upper parts is greenish brown, the belly silvery, a black spot on the shoulder, the whole surface iridescent. The menhaden is not a very palatable fish, but is rich in oil, which is used by painters, and is considered superior to linseed oil. Great quantities of this fish are taken in some seasons, and are sold for manure, one fish being considered equal to a shovelful of barn-yard manure, and 2,500 sufficient for an acre of land.

MENIER, EMILE-JUSTIN, 1826–81; b. Paris; in early life studied with Arfila, Dumas, and Pelouze, to become versed in the science of chemistry. He established large laboratories at St. Denis, which he freely opened for the use of students and scientific men. In 1859 he founded an annual prize for researches into the nature and properties of drugs, and in 1864 organized a school of practical chemistry, devoting the sum of 10,000 francs to establish lecture-courses on this subject. In the town of Noisiel, he built at his own expense model schools for the entire population, and gave 10,000 francs to be distributed among the school teachers in the different departments of France who reported the largest attendance of scholars. At one time he was at the head of the most important wholesale drug and chemical business in France, situated in the old quartier du Temple, in Paris. Retiring from this business, he undertook the manufacture of chocolate on a grand scale, and laid the foundation for a colossal fortune. He founded his factories at Noisiel, where he established a thriving settlement of pretty and convenient houses for his operatives, with schools, a hospital, baths, and other institutions for health and comfort. His factories eventually reached a trade of $5,000,000 per annum, and M. Menier became one of the wealthiest men in France. He resided in Paris in a palatial dwelling in the parc Monceaux, where he gathered together a remarkable and highly valuable collection of objects of art and *vertu*. In 1879 he purchased the chateau of Noisiel for the sum of $2,000,000. He was also the owner in Nicaragua of a section of territory 25 m. sq., and another tract of 6,000 acres on lake Nicaragua. Here were his plantations of cocoa-trees, whose product he made into chocolate at his factories in Noisiel. In 1862 M. Menier was chairman of one of the international juries of the London exhibition; at the Paris exhibition of 1867 he was commissioner for the republics of Nicaragua and Costa Rica. During the Franco-Prussian war he organized an ambulance corps, and was present during several battles, caring personally for the wounded. In 1870 he entered political life, being elected a member of the conseil-general of Seine-et-Marne, and later was returned to the chamber of deputies. He was also one of the few Frenchmen who had been elected members of the Cobden club. M. Menier devoted much of his time and influence during the latter years of his life to establishing closer commercial relations between France and the United States, and was one of the principal promoters of the Franco-American treaty of commerce, which he sought strenuously, by means of intelligent and skillful agents, to render acceptable to the two countries. In this effort he had only been partially successful at the time of his death.

MENIFEE, a co. in e. Kentucky, bounded on the n.e. by the Licking, and s. by the Red river, both tributaries of the Kentucky; 450 sq.m.; pop. '80, 5,410. The surface is hilly and broken, but not unfertile. The chief products are Indian corn, wheat, and oats. Sheep-grazing is a prominent industry. Chief town, Frenchburg.

MENIN, a frontier t. of West Flanders, Belgium, on the left bank of the Lys, which separates it from France, 30 m. s.s.w. of Bruges. It was formerly fortified, but its works have been demolished, and it is now a dismal and lifeless town, with some manufactures. Pop. '76, 11,337.

MENINGI'TIS (Gr. *mēninx*, a membrane) is the term employed in medicine to designate inflammation of the arachnoid and pia-mater (the middle and innermost of the membranes investing the brain).

This disease has been divided into three stages—the symptoms of the first being those of excitement, resulting from inflammation; those of the second being those of compression, showing that an effusion of fluid into the arachnoid cavity has taken place; while those of the third stage vary according as convalescence or death is the result.

Meningitis is especially apt to occur in children of a tuberculous diathesis, in which case the disease is usually described as acute hydrocephalus (q.v.). Scarlatina, measles, and other diseases caused by a blood-poison, may induce it in children. In adult life, the disease may often be traced to the action of typhous and marsh poisons, to intemperance, sunstroke, mechanical injuries, etc.

When the disease is due to any of the above-named blood-poisons, or to any constitutional cause, little can be done effectually in the way of special treatment. When it arises from mechanical injuries, bleeding, calomel, active purgatives, and cold applications to the head are often of use. The patient should be kept on low diet, and all mental excitement should be most carefully avoided.

MENINGI'TIS (*ante*), inflammation of the meninges. The meninges are the three investing membranes of the brain and spinal cord: the dura-mater, which lines the internal surface of the cavities; the pia-mater, which is in contact with the nervous substance; and the arachnoid, lying between the other two. Meningitis is generally confined to the arachnoid and pia-mater. In the former it is *arachnitis*, and in the latter *pieitis;* but in whichever membrane the inflammation commences the diagnosis between the two is

either difficult or impossible, and therefore the name *meningitis* is most applicable to either or both. Inflammation of the cerebral meninges is called cerebral meningitis, and that of the spinal meninges, spinal meningitis. When the membranes of both brain and cord are involved, the affection is called cerebro-spinal meningitis. Inflammation of the substance of the brain is *cerebritis*, while inflammation of the spinal cord is *myelitis* (q.v.). *Meningitis* may be arranged under the following heads: 1. Inflammation of the dura-mater, or pachymeningitis. 2. Cerebral meningitis, acute and chronic, including rheumatic meningitis. 3. Tubercular meningitis. 4. Spinal meningitis, acute and chronic. 5. Cerebro-spinal meningitis. 1. *Inflammation of the dura-mater*, or pachymeningitis (so called because it is inflammation of the *thick*, tough membrane, the dura-mater), was first described by Virchow under the latter title, and also, in some cases, under that of hematoma of the dura-mater. The inflammation may be on the outer surface of the dura-mater next the osseous substance, but this form is of rare occurrence, and never takes place except from injuries or osseous growths; it is to the affection attacking the inner surface of the dura-mater—that covered by the outer layer of the arachnoid membrane—to which attention is here called. A principal characteristic is the formation of adventitious membranes, which appear to be repetitions of the arachnoid, resembling it in its spider-web structure, not being false membrane, but having blood-vessels, which after a while rupture and cause extravasation of blood, which collects in cysts, thus constituting the peculiar form called hematoma of the dura-mater. In some cases there are as many as twenty layers of membrane. The extent covered by these cysts varies. They are generally oval, four or five inches long and a half an inch or more in thickness, containing from one ounce to sometimes more than a pound of blood. The brain beneath is, of course, compressed, anæmic, and often softened. The symptoms are, primarily, those of inflammation, and secondarily, those of pressure. The diagnosis is exceedingly difficult, and the termination is usually fatal. 2. *Cerebral meningitis.* Acute cerebral meningitis is not of very common occurrence, but nevertheless of great importance. The inflammation is of the same character as that which attacks other serous membranes—redness, with serum, coagulated fibrine or lymph, and pus; but these products are beneath, and not upon the surface of the arachnoid; in other words, they are deposited in the meshes of the pia-mater. Generally both hemispheres are involved, constituting what is called a bi-lateral affection. Post mortem examination often discloses the existence of serum beneath the arachnoid, but this may follow atrophy or anæmia. The condition most to be relied on is lymph, in sufficient quantity to be seen, or pus. The affection may be caused by injuries to the head, sometimes by exposure to the sun. Indulgence in spirituous liquors is not an infrequent cause. Acute cerebral meningitis sometimes occurs in connection with acute rheumatism of the joints, and is then called rheumatic meningitis and cerebral rheumatism; and it is regarded as being produced by the same causes which produce arthritic rheumatism. Acute meningitis may be mistaken for cerebral congestion, and after recovery in cases where the disease has not passed into the second stage, that of compression, it is often impossible to be certain as to what the affection has been, congestion or inflammation. Typhoid fever has been mistaken for meningitis, when there has been much delirium, but the presence of diarrhea, tenderness and gurgling on pressure in the right iliac region in typhoid fever, and the continuance of delirium in the latter affection, are sufficient to mark the distinction. Acute mania has some symptoms like those of acute meningitis, but there is not that morbid acuteness of the senses; moreover, in mania, fever and the symptoms of compression do not follow the delirium. Acute meningitis is a very dangerous disease, some cases ending fatally in 36 hours; but the fatal cases rarely extend beyond 9 days. The most unfavorable symptoms are coma (q.v.), difficulty of swallowing, feebleness of pulse, and want of nervous sensibility (anæsthesia). Recovery frequently takes place after there has been strabismus (see SQUINTING, *ante*), paralysis, and convulsions, but as a rule more than half of the cases terminate fatally.

Chronic cerebral meningitis, unconnected with a tuberculous condition, is not of frequent occurrence, although not so rare as the acute form. In most instances it is a sub-acute affection from the commencement, and is very insidious in its character, the symptoms being such as not to strongly attract attention. There is pain in the head, but not usually violent, and the febrile symptoms are unimportant. Vomiting is common, but as all these symptoms accompany other diseases, it is difficult to make the distinction. There is often a degree of stupidity or apathy, accompanied by irritability when aroused, and which, taken in connection with all the other symptoms and the circumstances attending the inception of the disease, furnish to the experienced practitioner data for forming in most cases a correct judgment. 3. *Tuberculous meningitis.* The recognition of this form of meningitis is due to Guersaut in 1823, and Gerhard and Rufz in 1833. Post-mortem examination reveals usually at the base of the brain beneath the arachnoid a fibrinous exudation, covering the pons-varolii, optic commissures and cerebellum; but the most prominent feature is the presence of numerous minute granulations having the appearance of gray tubercles, such as are found in the lungs and spleen in tuberculosis. These miliary tubercles, as they are called, are in the tract of the cerebral vessels, and according to Bastian and others within sheaths which are peculiar to the blood-vessels of the brain, and called perivascular sheaths, because surrounding the blood-vessels. (These perivascular sheaths are also found in the liver, q.v.). The symp-

toms are somewhat intermediate between those of acute and chronic simple meningitis, but the affection is frequently preceded by signs of tubercles in the lungs. It generally attacks children between 2 and 7 years of age, rarely appearing during the first year, but it is not confined to childhood. It usually commences with pain in the head, generally in the forehead. Vomiting is a frequent and early symptom, and there is more fever than in simple chronic meningitis. Remissions usually take place daily, with increased symptoms during the night. Sometimes the headache is very severe, attended by a short, sharp cry which has been called the "cephalic cry." There is great sensibility to light and sound. The pupils, in this the first stage, are contracted, and the conjunctiva suffused. A prominent symptom is the flushed face which comes on in paroxysms, often preceding convulsions. In the second stage there is drowsiness and less headache, although lancinating pains often occur. The pulse becomes less frequent, sometimes falling below the natural standard, and is often fluctuating and irregular. The respiration also becomes irregular. The pupils are dilated, and not infrequently unequal in size. Strabismus and oscillation of the eyeballs sometimes occur, and the patient often lies with the lids partially or widely open. There is often paralysis of one side of the face, and sometimes, more or less, of one side of the body. The muscles of the back of the neck often have tonic contractions, and there are sometimes contractions of the muscles of the limbs. There is almost always obstinate constipation in consequence of the sluggish and deranged condition of the nervous system, and there is generally retention of urine. The duration varies from 1 to 3 weeks and is almost invariably, some say invariably, fatal. 4. *Spinal meningitis.* This disease, like cerebral meningitis, may be acute or chronic, and it is also rare; excluding cases arising from injury, even more rare than the cerebral affection. The pathological conditions are similar to those in cerebral meningitis, but the symptoms are somewhat different, owing to effects manifested through the spinal nerves. Pain is felt in the spine, passing to the extremities, and it is increased by movements of the body more than by pressure over the spinal column, and there is great increase of sensibility of the surface of the body. The pain is referable to the posterior roots of the cord. Muscular contractions are referable to excitation by the disease of the anterior roots, sometimes causing the bending of the body backwards, producing the condition known as opisthotonos (q.v.). Sometimes the thoracic muscles are the subject of tonic spasm, causing great difficulty of breathing (dyspnœa). These are the early symptoms; subsequently paralysis and other symptoms follow, constituting the second stage. Acute spinal meningitis is rapid in its course, generally terminating fatally within 8 or 10 days. Asphyxia is the usual mode of death, in consequence of spasm of the respiratory muscles, or, more frequently perhaps, from paralysis of the respiratory nerves.

5. *Cerebro-spinal Meningitis.* This disease usually occurs as an epidemic, idiopathic cases being very rare. The epidemic form is a consequence of blood poisoning, and is a very dangerous affection which has sometimes extensively prevailed in different parts of the United States and Europe. It has sometimes received the name of spotted fever in consequence of the appearance of certain spots upon the skin in the course of the attack, but the spots are not constant accompaniments. The latter name was applied to an epidemic which prevailed in New England between the years 1807 and 1816, from the symptoms of which, as described, there is scarcely any doubt it was what is now called cerebro-spinal meningitis. This disease has been considered by some as a variety of typhus fever, but its greater suddenness and the absence of the characteristic mulberry rash of typhus prevent the general adoption of this view. The disease is usually ushered in with a chill followed by violent headache, vertigo, vomiting, and muscular rigidity passing into tetanus. There is here also, as in the other acute meningeal affections, increased sensitiveness of the skin; the face is pale, the pupils contracted, and the conjunctiva red. There is delirium, and usually as early as the second day in the more severe cases the extensor muscles of the neck and back are strongly contracted. The delirium soon passes into coma. According to Wunderlich there are three forms. In the first, the most rapidly fatal, the temperature rises at the approach of death to 108° F. and continues to rise for some hours after death. In the second form the fever has an irregular course and short duration. The third form is protracted and with great variations in temperature. In the commencement of an attack of cerebro-spinal meningitis the pulse is often slower than in health, but sometimes is more frequent. It increases with the disease, but generally does not exceed 100 beats per minute till towards the fatal termination, when it became very frequent. Headache is one of the most prominent symptoms. It was wanting in only one of 64 cases analyzed by Ames. The pain is intense, lancinating, and may be seated in the forehead, occiput, or the whole head. It is increased by noise, light, and the motions of the body, and is persistent. There is usually pain also in the spine, but not always throughout its whole length, and the probability is that the pain corresponds in location with the seats of the inflammation. In the less severe cases the delirium is rather slower in being developed, and varies much in intensity. At first the patient appears stupid, and sometimes remains so, but often becomes wildly delirious, and struggles with his attendants. As a rule there is obstinate constipation in consequence of the semi-paralyzed or deranged condition of the nervous system. The tongue varies in appearance, sometimes being large and flabby, and showing marks made by the teeth. As the disease progresses it becomes dry and dark. Petechial spots are frequently

observed, but they are not constant, and accompanying some epidemics more than others. They vary in size from a pin's head to a quarter of an inch or more, and are regarded as being due to an extravasation of hematine. They are of the nature of the ecchymoses which occur in scorbutus, purpura, and some cases of continued fever, and do not constitute a specific eruption. According to Tourdes, however, a rose-colored papular eruption, resembling that of typhoid fever, sometimes appears. The duration of the disease varies. Of fatal cases observed by Tourdes the shortest duration was 20 hours. Ames states the shortest duration to be 15 hours. The longest duration of fatal cases is stated by Tourdes to be 100 days. Of 160 cases analyzed by Dr. S. B. Hunt 12 died within the first 24 hours; 92 died before the end of the fifth day: 14 before the end of the tenth; 4 before the end of the fifteenth, and 18 survived for shorter or longer periods. Some writers regard the disease as belonging to the class of fevers instead of primarily to the nervous system, and this is probably the correct view. Boudin, in 1849, proposed to call it cerebro-spinal typhus. It attacks all ages, but the larger number of cases occur between 20 and 30 years, and the liability is rather small before 7 years. Males are more frequently the subjects than females, but the difference is not great. It prevails more in the winter and spring than during the summer. It is stated to be a disease of confined quarters, such as barracks and prisons. From 1837 to 1842 it prevailed in most of the crowded barracks of France, and has been a frequent visitor of the galley slaves at Toulon.

MENIP'PUS, one of the most noted of the cynic philosophers, and a pupil of Diogenes, was born at Gadara, in Syria, and flourished in the 1st c. B.C. He was originally a slave, and acquired considerable wealth by usury, but lost it all again, in consequence of which he strangled himself out of mortification. He satirized the philosophers of his time in terms so severe that the most biting satires were afterwards designated Menippean. Lucian pronounces him "the greatest snarler and snapper among all the old dogs" (the cynics). His works were thirteen in number, according to Diogenes; they are all lost.

MENISPERMA'CEÆ, a natural order of exogenous plants, mostly tropical and subtropical; creeping and twining shrubs, the wood of which is frequently disposed in wedges, and without the zones usual in exogenous stems. The leaves are alternate, generally simple, destitute of stipules; the flowers small, unisexual, often in large panicles or racemes. There are about 200 known species, including those which by some botanists have been formed into the two small separate orders *schizandraceæ* and *lardizabalaceæ*. The true menispermaceæ are generally bitter and narcotic; some of them are very poisonous, and some are valuable in medicine. See CALUMBA, CISSAMPELOS, and COCCULUS.

MENNO, SIMONS, the founder of the later school of Anabaptists (q.v.) in Holland, was born at Witmarsum, in Friesland, in 1496; took orders in 1524, and officiated for some years as a priest, first in the village of Pinjum, and afterwards in his native place. The study of the New Testament, however, about the year 1530, excited grave doubts in his mind regarding the truth both of the doctrine and constitution of the church; and in 1536 he withdrew from it altogether. He now attached himself to the party of the Anabaptists, was re-baptized at Leeuwarden, and appointed a teacher and bishop at Gröningen. Henceforth his great endeavor was to organize and unite the scattered members of the Anabaptist sect in Holland and Germany. With this design he spent much time in traveling; but Friesland was his chief residence until persecution compelled him to flee to Wismar. Finally he settled at Oldeslohe, in Holstein, where he found not only protection, but even encouragement, and was allowed to establish a printing-press for the diffusion of his religious opinions. Here he died in 1561. He was a man of gentle, earnest, modest, and spiritual nature, with no trace about him of the wild fanaticism of the earlier Anabaptists. His book of doctrine, entitled *Fundamentbuch von dem rechten Christlichen Glauben*, was published in 1539. See ANABAPTISTS.

MEN'NONITES, deriving their name from Simon Menno, are claimed by some Baptists as their predecessors, coming down directly from the Waldenses; but this claim is denied generally by other Protestant denominations, who regard the Mennonites simply as the followers of Menno, who, in the 16th c. drew together the better class of the Anabaptists under new rules, and expounded to them the principles of revealed truth. As thus instructed they professed belief in the personal reign of Christ on the earth during the millennium; in the unlawfulness of oaths, of war—even in resisting violence and wrong,—of lawsuits, and of allowing civil magistrates to be members of the church. All immoral practices they, as a denomination, condemned; and in their own conduct were exemplary, prudent, and devout. So far from being guilty of the excesses which have made the name Anabaptists odious, they are numbered by some writers among the best Christians which the church ever knew, and the best citizens which the state ever had. Menno, in order to unite his followers together, separated them from all other Dutch and German Protestants and gave them a regular system of church order. His statements of doctrine were so explained and modified that they resembled strongly the general system of the reformed churches, and thus greatly promoted the growth and influence of his followers. The stringent discipline which he maintained soon produced divisions in the flock. The parties formed were known by various names, as the fine

and the coarse, denoting different degrees of strictness in discipline, the Flandrians and Waterlanders, named from the districts in which the disputants lived; the orthodox—called from their leader, Dr. Samuel Apostool, Apostoolians—and the remonstrants were divided in their views concerning vital doctrines.

I. The Dutch Mennonites. William, prince of Orange granted the Mennonites a settlement in the United Provinces near the end of the 16th century. In 1626 their confession of faith was published; in 1626 an association was formed among them, and was strengthened in 1649, which in its organization resembled in some respects that of the present Congregationalists in the United States. As a result of this fellowship some of the rigorous rules of Menno and his successors were softened and improved. Each congregation chose its own pastor who was called an exhorter, and, not being supported by his people, provided for himself in the best way he could by engaging in business or trade. Where no pastor could be obtained, the deacon and deaconess ministered respectively to the men and women. In the 17th and 18th c. persecution drove many of the Mennonites from Germany and Switzerland to Holland, so that at one time the denomination, in what they regard as their parent country, contained at least 160,000 persons. In 1735 their theological seminary was established at Amsterdam, the students of which receive instruction in a part of the chapel that also contains the library. A knowledge of Latin and Greek is a necessary qualification for admission; the lectures are in Latin, and instruction is provided in Hebrew, church history, physics, moral philosophy, and kindred studies. This institution was at first supported by contributions obtained in Amsterdam alone, but now churches in other places also send aid. All the students have the ministry in view, and some of them receive aid from a public fund. The educated ministry thus provided has made the denomination respectable among other Protestants, and has raised up theologians that are highly esteemed. In 1795 they obtained equality in law among other Protestants, and have since gradually formed themselves into one national body. In 1811 they united in forming a society to promote theological education. A foreign missionary society also receives general support.

II. The Mennonites were numerous in Germany in the 17th century. In Moravia alone they amounted so 70,000. In 1622 they were expelled by Ferdinand II., and after a brief sojourn in Hungary and Transylvania removed to Russia. They were very numerous in eastern Prussia, especially at Dantzic, Marienburg, and Elbing, where their cleanliness and industry soon transformed desolate marsh grounds into gardens. But persecution compelled many of them to flee until after 1732, when the king removed some restrictions from them, so that they gradually increased again in numbers until 1789, when the right to acquire property in land was taken away, yet with all their hindrances they have maintained themselves in some parts of Prussia and have especially made the valley of the Vistula "the garden spot of the land."

III. In 1786 Catharine II. invited the Mennonites to settle in Russia with other German emigrants, and between that time and the close of the century about 350 families found there a home, on and near the island of Khortiz, in the lower Dnieper. The privileges pledged to them were: Protection from all attacks; freedom of worship; a gift of 190 acres of land for each family; exemption from taxation for ten years; money for their journey; money and wood with which to establish themselves; freedom of trade and manufactures; the administration of oaths in their own way, and perpetual exemption from military service. These great advantages induced a large and constant Mennonite immigration into Russia until 1817, the new colonists settling near their brethren in the government of Taurid, and between the rivers Molotchua, Dnieper, and Tokmak; and from that time they continued to increase in numbers and prosperity. They were always protected and favored by the government, and, chiefly through the character and efforts of Johann Cornies, preserved uninjured their German institutions and habits. This remarkable man, without office or rank, though both were once and again offered him by the government, exerted a very great influence over his countrymen and over the government in their behalf. Through his efforts, besides having their own schools and churches, and retaining their native language and ways of living, they enjoyed also a kind of popular government among themselves; each group of towns being under a magistrate chosen by themselves from among themselves, and forming the organ of communication between them and the imperial government. In 1861 the late emperor, Alexander II., gave new lands and confirmed all the old concessions to a colony of Mennonites who established themselves on the Volga. These lands, indeed, as well as those which Catharine had given, were not altogether without restriction. The holders could bequeath them to their children or sell them to any of their own community, but could not part with them to any one except a Mennonite unless by express permission from the government. But within the last decade the conduct of the imperial government towards this community as well as towards other colonists has been greatly changed. In June, 1871, an edict, addressed to all the colonists in the empire—German Lutherans and Roman Catholics, as well as Mennonites, Bulgarians, and others to whom lands and privileges had been given—limited the period of exemption from military service to ten years, with the proviso that, as to furnishing recruits, the laws ruling colonists should continue in force only till the publication of a general law on military duty. As such a law might be issued at any time, the Mennonites, with the rest, might be compelled to furnish recruits, notwithstanding their belief in the unlawfulness of war. The general

law of Russia does not allow emigration, but in this instance ten years were allowed for any to leave the empire who were unwilling to comply fully with the laws. Inquiries were at once commenced by some of the leading Mennonites concerning the best location for a new home. Many answers highly favorable having been received from several parts of the United States and Canada, and circulated widely among the people, the sum of $20,000 was raised by their voluntary contributions to send a delegation to visit the most promising regions of America and report the result of their observations on their return.

IV. The first Mennonites came to the United States in 1683, influenced doubtless by the sentiments which the society of Friends held in common with them, William Penn invited them to settle in his new province of Pennsylvania. Accepting the kind offer, 500 families within half a century made there their homes. In 1708 they built a school and church in Germantown. In the following year another colony settled in what is now Lancaster county, and was strengthened by other families in several successive years, so that in 1735, 500 families were found in that county alone. Afterwards their descendants emigrated to various places in Maryland, Ohio, New York, Indiana, and Canada. At the present time, while they are most numerous in the states already mentioned, some of them are found in nearly every part of the land. The results of the visit of the Russian delegation are very apparent in the arrival of large numbers of families who have bought lands on the prairies of the west and in the southern states; and they, probably, are the advance guard of all the Russian Mennonites. As they do not publish their statistics, accurate statements concerning their numbers cannot be made. They have a publishing house at Elkhart, Ind. Their bishops, ministers, and deacons are all chosen by lot and meet semi-annually in district conferences, Their pastors give their services gratuitously. Their confession of faith was translated and published at Philadelphia in 1727. Besides the main body of the denomination there are in America: 1. The *Reformed*, or strict Mennonites, who in 1811 seceded from the rest and profess to maintain strictly the dicipline of Simon Menno. 2. The *New* Mennonites organized in 1847 by about a dozen ministers of the old denomination. 3. The *Evangelical* Mennonites, who in 1856 seceded from the previous secession. 4. The *Amish* Mennonites, who greatly resemble the Reformed, and are sometimes called Hookers, because they substitute hooks for buttons on their clothes. They concern themselves but little in political matters, sometimes voting at elections when school officers are to be chosen. They have no denominational schools or religious paper, but send their children to the public schools and depend for religious literature on the regular Mennonites. See ANABAPTISTS; MENNO; *ante*.

MENOBRANCHUS, PROTEUS OF THE LAKES, or FISH LIZARD, a genus of batrachians belonging to the division of perenibranchiate amphibia of the order amphipneusta, which also includes the European proteus. See PROTEUS, *ante*, the axolotl (q.v.), amphiuma (q.v.), siren (q.v.), menophome (q.v.) The menobranchus has a large head and mouth; both upper jaw and palate armed with small sharp teeth; three branchial tufts on each side of the short neck; tail compressed laterally and fringed with a membrane; four limbs, each four-toed, the toes having no nails; small eyes without lids; large tongue, movable only at tip; nostrils small and near the lip, which is fleshy; body long and covered with a smooth skin. The most common species is *M. maculatus*, or spotted menobranch, which has an ashy gray color with darker spots and a brown stripe extending from the snout over the eyes. It inhabits the great lakes of North America and lake Champlain. Another species, *M. lateralis*, is dark brown above, and it has dark bands extending from the nostrils through the eyes and along the sides to the tail; the color of the belly is a dirty reddish brown, and the body is more slender than in *M. maculatus*. It is found in the Ohio river and other tributaries of the Mississippi on the eastern side, from Pennsylvania to Tennessee.

MENOMI'NEE, a co. in the s.w. part of the upper peninsula of Michigan; bounded s.e. by Green bay, and s.w. in its entire extent by Menominee river, which separates it from Wisconsin; drained also by Cedar river; 1350 sq.m.; pop. '70, 1791. It is traversed by the Chicago and Northwestern railroad. The surface is uneven and covered with extensive pine forests. The climate is cold. Lumber is the chief export, and there are four large saw-mills in operation. A great part of the population are engaged in iron mines and marble quarries. Chief town, Menominee.

MENOMO'NEE, a t., the co. seat of Dunn co., Wisconsin; on the Red Cedar river and on the West Wisconsin railroad; 25 m. n.w. of Eau Claire, and 42 m. n.e. of Red Wing, Minn.; pop. 3,433. There is a large trade in lumber and in furs; several carriage and machine shops, a sash factory and several brick yards. The town has the county court-house, 2 excellent public schools, 7 churches, and there are two weekly papers.

MENOMONEES, or MENOMINEES, a tribe of Indians first described near the Menominee river in Wisconsin, which empties into Green bay. The name, both of the river and the tribe, is synonymous with wild rice, which is found in great abundance near the mouth of the river, and was an important part of their food. Fathers Allouez and André established a mission among them in 1670, and describe them as lighter in complexion than the neighboring tribes. They remained allies of France in the wars with the English, aided in the relief of Detroit in 1712, and were a part of

the French-Indian forces until the time of the revolutionary war, when a part of the tribe went over to the English. In the war of 1812 they again were with the English, and aided in the capture of Mackinaw that year, and under their chief Souligny formed a part of the Indian force in command of the great chief Tecumseh at the siege of fort Meigs, on the Maumee, in 1813, and of the party repulsed by col. Croghan at Sandusky about the same time. Mar. 30, 1817, their chiefs by treaty ceded grants of land to Clarke, Edwards, and Choteau. Successive treaties were made between them and the U. S. government in 1825, 1827, 1831, 1836, 1848, 1852, and 1854. By the last they are in possession of a reservation on the upper Wolf and Oconto rivers in Wisconsin, 50 m. from Green bay, containing 240,400 acres. Their numbers decrease rapidly; in 1822, estimated, 3,900; in 1872, 1480. The Menomonees are one of the Algonquin tribes.

MEN'OPOME, *Protonopsis horrida*, one of the largest of batrachians, found in the Ohio and other rivers of the same region, and known on their banks by many names, such as hellbender, mud devil, ground puppy, young alligator, and tweeg. In form it resembles the newt and salamander; the head is flat and broad; the teeth in two concentric rows in the upper jaw; and one row in the lower, numerous and small; it is about 2 ft. long, and of a slaty gray color, with dark spots. Notwithstanding its small teeth it is fierce and voracious, feeding chiefly on fish and batrachians; and partly from its habits, partly from its ugliness, is much disliked by the fishermen of the Ohio, who erroneously regard it as venomous.

MENSES. See MENSTRUATION, *ante*.

MEN'SHIKOFF, or MENSCHIKOFF. See MENCHIKOW, or MENCHIKOFF, *ante*.

MENSTRUA'TION is the term applied to the discharge of blood which issues every month from the generative organs of the human female during the period in which she is capable of procreation.

The first appearance of this discharge, to which the terms *menses* and *catamenia* (each having reference to the monthly period) are indiscriminately applied, is a decided indication of the arrival of the period of commencing womanhood, and is usually accompanied by an enlargement of the mammary glands, and other less important changes. In this country, menstruation usually commences between the 14th and the 16th years, and terminates between the 48th and 52d years. The interval which most commonly elapses between the successive appearances of the discharge is about four weeks, although it is often shorter; and the duration of the flow is usually three or four days, but is liable to great variations. The first appearance of the discharge is usually preceded and accompanied by pain in the loins and general disturbance of the system, and in many women these symptoms invariably accompany the discharge. As a general rule there is no menstrual flow during pregnancy and lactation, and its cessation is one of the first signs that conception has taken place.

MENSURA'TION, the name of that branch of the application of arithmetic to geometry which teaches, from the actual measurement of certain lines of a figure, how to find by calculation, the length of other lines, the area of surfaces, and the volume of solids. The determination of lines is, however, generally treated of under trigonometry (q.v.), and surfaces and solids are now understood to form the sole subjects of mensuration. As the length of a line is expressed by comparing it with some well-known *unit* of length, such as a yard, a foot, an inch, and saying how many such units it contains, so the extent of a surface is expressed by saying how often it contains a corresponding superficial unit, that is, a square whose side is a yard, a foot, an inch; and the contents of solid bodies are similarly expressed in cubes or rectangular solids having their length, breadth, and depth, a yard, a foot, an inch. To find the length of a line (except in cases where the length may be calculated from other known lines, as in trigonometry) we have to apply the unit (in the shape of a foot-rule, a yard measure, a chain), and discover by actual trial how many units it contains. But in measuring a surface or a solid we do not require to apply an actual square board, or a cubic block, or even to divide it into such squares or blocks; we have only to measure certain of its boundary-lines or *dimensions;* and from them we can calculate or infer the contents. To illustrate how this is done, suppose that it is required to determine the area of a rectangular figure ABCD, of which the side AB is 7 in., and the side AC 3 inches. If AC be divided at the points F and E into 3 portions, each 1 inch long, and parallels be drawn from F and E to AB or CD; and if AB be similarly divided into 7 parts, of 1 inch each, and parallels be drawn to AC or BD through the points of section, then the figure will be divided into a number of equal squares or rectangular figures, whose length and breadth are each 1 inch; and as there are 3 rows of squares, and 7 squares in each row, there must be in all 7×3, or 21 squares. In general terms, if a and b be the lengths of two adjacent sides, there are a rows of little squares, and b squares in each row. Hence *the area of a rectangle = the product of two adjacent sides.*

The areas of other figures are found from this, by the aid of certain relations or properties of those figures demonstrated by pure geometry; for instance, the area of a parallelogram is the same as the area of a rectangle having the same base and altitude, and is therefore equal to the base multiplied by the height. As a triangle is half of a parallelogram, the rule for its area can be at once deduced. Irregular quadrilaterals and polygons are

measured by dividing them into triangles, the area of each of which is separately calculated. For the area of the circle, see CIRCLE. By reasoning similar to what has been employed in the case of areas, it is shown that the volume of a rectangular parallelopiped or prism is found in cubic inches by multiplying together the length, breadth, and depth in inches; and the oblique parallelopiped, prism, or cylinder, by multiplying the area of the base by the height.

MENTAL PHILOSOPHY. See MIND.

MENTA'NA, BATTLE OF, Nov. 3, 1867. On Oct. 28 and 29 a detachment of French troops, under gen. de Failly, landed at Civita Vecchia, a seaport town of Italy. Garibaldi, who was before the Roman gate of St. Jean, had defeated the pontifical troops at Monte Rotondo, 17 m. n.w. of Rome, with 4 battalions of volunteers; and, proposing to gain possession of Rome and join the papal states to the kingdom of Italy, was intending to proceed there forthwith, but hearing of the approach of the French brigade he fell back to Monte Rotondo and Mentana, in order to raise defenses. On Nov. 2 he advanced in 2 detachments, one toward Correse and one toward Tivoli. The Tivoli column, meeting the French troops, 2,000 men under Kanzlar and Polhès, led by 3,000 of the pontifical troops, fell back to Mentana, 13 m. n.e. of Rome; were pursued by the enemy; and on Sunday, Nov. 3, an engagement of 4 hours followed, ending in the defeat of the volunteers. The French in this battle made the first trial of the Chassepot gun; their troops were regulars thoroughly drilled and disciplined, and the loss on the other side was heavy and crushing. Garibaldi had undisciplined, poorly armed recruits; infantry only. With the conquering army in front, they crossed the Italian frontier, to find the Italian army in the rear, which overwhelmed them, seized their arms, and took many of them prisoners; among them Garibaldi, who was arrested at Correse on his journey to Caprera, and imprisoned in the fortress of Varignano, near Spezzia, an island of Greece; and the Italian troops retired from the papal states. Garibaldi, protesting against this treatment, claiming the protection due to an American citizen and an Italian deputy, was set at liberty on the 26th. To commemorate this victory a medal was struck by order of the pope, in the shape of a cross, made of silver, and presented to all who took part in the battle. It bore the inscription, *Fidei et Virtuti*, and *Hinc Victoria*. A monument to the Garibaldians who fell at this battle was dedicated Nov. 25, 1877.

MEN'TCHIKOF, MENTSCHIKOFF, or MENZIKOFF. See MENCHIKOW or MENCHIKOFF, *ante*.

MENTONE (FR. *Menton*), a t. in the department of Alpes Maritimes, France. It is pleasantly situated on the shore of the Mediterranean, and from its southern exposure, as well as a high sheltering range of mountains on the n., it enjoys a salubrious and agreeable climate. In its environs are groves of orange, lemon, and olive trees. Latterly Mentone has become a favorite winter resort of invalids and health loungers from England, Germany, and other countries; and is greatly improved as a place of residence by the addition of numerous hotels, pensions, etc. In 1860, by a vote of the inhabitants, Mentone was detached from the small principality of Monaco, and annexed to France; the French government paying 4,000,000 of francs to the prince of Monaco for relinquishing his rights, and according to him certain privileges. Mentone is within a mile and a half of the Italian frontier on the railway and Corniche road from Nice to Genoa. Pop. '76, 6,891.

MENTONE (*ante*) is celebrated for its bone caves, which are situated upon the e. bay. They are about 90 ft. above the Mediterranean, formed by rifts in the Roches Rouges mountain, and have furnished interesting pre-historic fossils and implements. In the spring of 1872 a fossil human skeleton was found in one of these caves, buried 21½ ft. beneath the surface. The skull is said to have had shells upon it, as if the head had been ornamented with them, and the teeth of the stag, these articles being "perforated and forming a net-work about the head." How the net-work was retained in position it is impossible to say with certainty. The cranium was fractured before and behind, so that no perfect measurement could be made. It belongs to the long-headed, or dolichocephalic, branch of the human family, and is said to have a facial angle of 85°. The height of the figure is estimated to have been 6 feet.

MENTOR, a village and township of Lake co., Ohio; 23 m. n.e. of Cleveland on the Lake Shore railroad; the township extends to the shore of lake Erie; pop. '70, 1666. There are two churches and a graded school. The people are almost all engaged in agriculture and country trade. This little town is noted as having been for some years the residence of gen. James A. Garfield, elected in 1880 president of the United States.

MENTOR, the son of Alcimus, was the trusted friend of Ulysses, who, on setting out for Troy, left to him the charge of his household, and by him Telemachus was educated. His name became a sort of appellative for an instructor and guide of the young.

MENTZ. See MAINZ, *ante*.

MENU. See MANU.

MENU'RA. See LYRE-BIRD.

MENZA'LEH, LAKE, a lake of Egypt, extends e. from the Damietta branch of the Nile, and is separated from the Mediterranean by a narrow strip of land, through which,

however, there are several openings. It receives the Pelusiac and Tanitic branches of the Nile, and is 37 m. in length, by about 16 m. in average breadth. Its surface is studded with islands, the most interesting of which is Tennees, the ancient Tennesus, with Roman remains of baths, tombs, etc. An extensive fishery is carried on on the lake; and its shores abound in wild-fowl. The line of the Suez canal passes through the eastern portion of lake Menzaleh.

MENZEL, WOLFGANG, an eminent German author, was the son of a medical practitioner, and was born at Waldenburg, in Silesia, June 21, 1798. He studied at Jena and Bonn, was for two years schoolmaster at Aargau in Switzerland, and in 1824 returned to Germany. He first made himself known in the literary world by his *Streckverse* (Heidelb. 1823), a volume replete with poetry and wit, and opening up many novel and ingenious views of art and literature. He then engaged with several coadjutors in a periodical called *Europäische Blätter* (Zür. 1824–25), in which war was waged against the prevalent heartlessness and formality of German literature, in which he was led to attack vehemently the school of Goethe. This involved him, however, in a controversy with the extreme admirers of that poet. He was afterward engaged in a succession of controversies, in consequence of opinions expressed by him in his various publications; among which may be noticed his *Geschichte der Deutschen* (3 vols. Zür. 1824–25, and several editions); *Die deutsche Literatur* (2 vols. Stuttg. 1828, and several editions); *Taschenbuch der neuesten Geschichte* (5 vols. Stuttg. 1829–33); *Mythologische Forschungen und Sammlungen* (1842, etc.); and *Geschichte Europas von* 1789–1815 (1853). As a poet, he acquired a high reputation by a volume entitled *Rübezahl* (1829), and another entitled *Narcissus* (1830). His *Gesänge der Völker* (1851) is a valuable lyrical collection. After the July revolution, he set himself to counteract the French influence that set in strongly among the youth of Germany, whence Börne gave him the nickname of *der Franzosenfresser* ("the Frenchman-eater"). He also published *Preussen und Oesterreich im Jahre* 1866, in 1866; *Rom's Unrecht* in 1871; a history of the war of 1870–71; etc. He died in 1873.

MEPHISTOPH'ELES, one of the seven chief devils in the old demonology; the second of the fallen archangels, and the most powerful of the infernal legions after Satan. He figures in the old legend of Dr. Faustus as the familiar spirit of that renowned magician, and his name was commonly used as a term of jocular reproach. To modern readers he is chiefly known as the cold, scoffing, relentless fiend of Goethe's *Faust*, and the attendant demon in Marlowe's *Faustus*.

MEP'PEL, an important trading and manufacturing t. in the Netherlands province of Drenthe, is situated near the northern boundary of Overyssel. Pop. '76, 7,901. It has a trade in butter, cattle, rye, and buckwheat. In 1875 the butter brought to market weighed 3,705,779 lbs. The principal manufactures are spinning flax, weaving linens, sail-cloth, and coarse striped woolen fabrics. There are also corn, saw, and oil mills, breweries, etc. The union of several important water-ways with the Meppeller Diep, through which they flow into the Zuyder Zee, brings a large shipping-trade to the town. Peat is manufactured extensively in the moss-land of Overyssel, the greatest part of which is forwarded from Meppel to Amsterdam and other cities of the Netherlands. Butter, cattle, and bark are sent to England and Germany. Meppel is about nine centuries old, and has often suffered the evils of war, being favorably situated for receiving a garrison.

MEQUINEZ. See MIKNAS.

MERCADANTE, SAVERIO, 1797–1870; b. Altamura. He studied the violin and the flute under Zingarelli at the conservatorio San Sebastiano at Naples, but soon turned his attention to compositions for the voice, at the earnest solicitation of his master. In 1818 he produced a grand cantata, entitled *L'Unione delle Belli Arti*, which was performed at the Teatro Fondo, and met with a very favorable reception. This led to an engagement at the Teatro San Carlo, where his first opera, *L'Apoteosi d'Ercole*, was well received. After this he composed a great number of operas; but many of them were not successful. In 1833 he was appointed chapel master at the cathedral of Novara. In 1836 his opera, *I Briganti*, was performed in Paris, but proved a complete failure, in spite of the extraordinary cast of Rubini, Tamburino, Lablache, and Grisi. He was made director of the royal conservatory at Naples in 1840, but became totally blind in 1862. Though his compositions are vivacious and graceful, his opera *Il Giuramento* and some of his sacred pieces are all that have survived him.

MERCANTILE LAW. This is the only branch of municipal law which, from the necessity of the case, is similar, and in many respects identical, in all the civilized and trading countries of the world. In determining the relations of the family, the church, and the state, each nation is guided by its own peculiarities of race, of historical tradition, of climate, and numberless other circumstances, which are almost wholly unaffected by the conditions of society in the neighboring states. But when the arrangements for buying, selling, and transmitting commodities from state to state alone are in question, all men are very much in the same position. The single object of all is that the transaction may be effected in such a manner as to avoid what in every case must be sources of loss to somebody, and by which no one ultimately is a gainer—viz., *disputes and delay*.

At a very early period in the trading history of modern Europe, it was found that the only method by which these objects could be attained was by establishing a common understanding on all the leading points of mercantile, and more particularly of maritime law. This was effected by the establishment of those maritime codes, of which the most famous, though not the earliest, was the *Consolato del Mare*. It is sometimes spoken of as a collection of the maritime laws of Barcelona, but it would seem rather to have been a compilation of the laws and trading customs of various Italian cities—Venice, Pisa, Genoa, and Amalfi, together with those of the cities with which they chiefly traded—Barcelona, Marseilles, and the like. That it was published at Barcelona towards the end of the 13th c., or the beginning of the 14th, in the Catalonian dialect, is no proof that it originated in Spain, and the probability is that it is of Italian origin. As commerce extended itself to the north-western coasts of Europe, similar codes appeared. There was the *Guidon de la Mer*, the *Rôles d'Oléron*, the *Usages de Damme*, and, most important of all, the ordinances of the great Hanseatic league. As the central people of Europe, the French early became distinguished as cultivators of maritime law, and one of the most important contributions that ever was made to it was the famous ordonnance of 1681, which formed part of the ambitious and in many respects successful legislation and codification of Louis XIV. See CODE. All these earlier attempts at general mercantile legislation were founded, as a matter of course, on the Roman civil law, or rather on what that system had borrowed from the laws which regulated the intercourse of the trading communities of Greece, perhaps of Phenicia and Carthage, and which had been reduced to a system by the Rhodians.

From the intimate relation which subsisted between Scotland and the continent of Europe, the lawyers of Scotland became early acquainted with the commercial arrangements of the continental states; and to this cause is to be ascribed the fact that down to the period when the affairs of Scotland were thrown into confusion by the rebellions of 1715 and 1745, mercantile law was cultivated in Scotland with much care and success. The work of lord Stair, the greatest of all the legal writers of Scotland, is particularly valuable in this department.

In England the case was very different. After the loss of her French provinces the legal system of England became wholly insular, and there was no branch in which it suffered more in consequence of being thus cut off from the general stream of European progress than the law-merchant. It was lord Mansfield who, whether guided by the wider traditions of his original country, or deriving his views from the source from which these traditions sprung, viz., the Roman law, as modified and developed by continental jurisprudence, introduced those doctrines of modern commercial law which English lawyers have since developed with so much acuteness and logical consistency. Many attempts have recently been made to assimilate the commercial laws of England and Scotland, and a commission of lawyers of both countries was recently appointed for the purpose. One of the most important results of their deliberations was the mercantile law amendment act, 19 and 20 Vict. c. 60.

MERCAP'TAN and MERCAPTANS, a class of compounds discovered by Zeise in 1833. The name is a contraction of *mercurio corpus aptum*, given on account of its powerful reactions with compounds of mercury. Zeise's original mercaptan is ethyl hydrosulphide, C_2H_5SH. It is the sulphur analogue of ethyl alcohol, and is produced by the action of hydrosulphide of potassium on ethyl sulphate of calcium. A solution of caustic potash of sp. gr. 1.3 is saturated with sulphureted hydrogen gas and mixed in a retort with an equal volume of solution of ethyl sulphate of calcium of the same density. The retort is connected with a condenser and heated by a bath of salt and water. Mercaptan and water are distilled together, and may be separated by decantation or by a tap funnel, the sp. gr. of mercaptan being 0.8325 at 69.8° F. and only slightly soluble in water. It boils at 96.8° F. giving off a vapor having an intolerable odor of onions, which adheres to the clothing with great obstinacy. It is very inflammable, giving a blue flame. In contact with red oxide of mercury, even in the cold, mercaptan causes a violent reaction with the formation of water and a white substance soluble in alcohol, and separating from the solution in crystals having the formula $Hg(SC_2H_5)_2$.

MERCATOR, GERARD, 1512–94; b. Flanders; the name is a Latinized form of his real name, Kauffman, i.e., merchant. Having finished his elementary education at Bois-le-Duc he studied and took a degree in philosophy at the university of Louvain. After leaving the university, he made a profound study of the sciences of geography and mathematics, and in 1559 was appointed cosmographer to the duke of Juliers. His name is perpetuated by the projection used in nautical maps, in which the meridians are represented by parallel lines, and parallels of latitude by straight lines intersecting the meridians at right angles. The projection, however, seems to have been applied to nautical maps by Edward Wright. Besides a large number of maps, Mercator compiled a chronological table under the name of *Chronologia a Mundi Exordio ad annum* 1556; and a series of geographical tables, *Tabulæ Geographicæ ad Mentem Ptolemaei Restitutæ*. He also wrote two theological treatises, one a *Harmony of the Gospels*, and the other, which was condemned by the church, a work on the *Creation of the World*.

MERCATOR'S PROJECTION, or MERCATOR'S CHART. See MAP.

MERCED', a co. in California, extending n.e. from the main coast range, traversed by the San Joaquin river, and by the Visalia division of the Central Pacific railroad; 1680 sq.m.; pop. 2,807. Cattle, wheat, wool, and fruit are the chief products; brandy and wine are the principal manufactures. Capital, Snelling.

MERCER, a co. in n.w. part of Dakota, adjoining Missouri on the n. and e.; 9,000 sq.m.; pop. not enumerated in 1870; in 1880 the census states that it is combined with Billings, Morton, and Stark cos.; total pop., 1563. It is drained by the Big Knife and other branches of the Missouri river. The surface is rolling and capable of cultivation, but at present the locality is sparsely settled and there is little trade or agriculture.

MERCER, a co. of n.w. Illinois, bounded w. by the Mississippi river, and traversed by the Chicago, Burlington, and Quincy, and the Rockford, Rock Island and St. Louis railroads; 540 sq.m.; pop. '80, 19,505. The surface is rolling, the soil fertile. Live stock, grain, and wool are the principal products. Coal is mined in various places. Carriages and wagons are the chief articles of manufacture. Capital, Aledo.

MERCER, a co. in the blue-grass region of Kentucky, near the center of the state, and bounded n.e. by the Ohio river; 308 sq.m.; pop. '80, 14,141. Live stock, wheat, corn, and wool are the chief productions. Capital, Harrodsburg.

MERCER, a co. of Missouri, bounded n. by Iowa, and traversed by the south-west division of the Chicago, Rock Island and Pacific railroad; 480 sq.m.; pop. '80, 14,674. It is well timbered, with a fertile soil, containing deposits of iron, copper, and coal. Cattle, grain, and wool are among the chief products. Capital, Princeton.

MERCER, a co. of New Jersey, bounded s.w. by the Delaware river, and traversed by the Camden and Amboy, the New Jersey, the Belvidere, Delaware, and other railroads; about 220 sq.m.; pop. '80, 58,058. The surface is generally level, the soil very fertile and well cultivated. The principal productions are live stock, wool, grain, tobacco, hay, fruit, and garden products. The manufacturing interests include iron, iron castings, stone, earthen and metallic wares, carriages, clothing, woolen goods, flour, etc. Capital, Trenton.

MERCER, a co in Ohio, bounded on the w. by Indiana; 470 sq.m; pop. '80, 21,808. The great canal reservoir, probably the largest artificial lake in the world, is nearly all in this county. It is 8 m. in length, 3½ in width, and 10 ft. deep, and covers an area of 17,000 acres. Its waters feed the Miami canal. The chief productions of the county are cattle, grain, and wool. Coal is mined to a considerable extent, and bricks and timber are extensively manufactured. Capital, Celina.

MERCER, a co. of Pennsylvania, bounded w. by Ohio, and traversed by the Altantic and Great Western, the Erie and Pittsburg, the Jamestown and Franklin, and the Shenango and Allegheny railroads; 600 sq.m.; pop. 49,977. The surface is uneven, the soil very fertile. Coal is abundant; chief productions, live stock, grain, and wool. There are manufactures of leather, lumber, flour, carriages, iron, and iron castings. Capital, Mercer.

MERCER, a co. of West Virginia, bounded s. by Virginia, and lying between Great Flat-top mountain on the n.w., and East River mountain on the s.e; 450 sq.m.; pop. '80, 7,467. It is a well-timbered region, with a fertile soil, containing deposits of coal and limestone. Capital, Princeton.

MERCER, CHARLES FENTON, LL.D., 1778–1858; b. Fredericksburg, Va.; graduated at Princeton in 1797; in 1798, in anticipation of a war with France, he was commissioned by Washington as capt. of cavalry; studied law, and in 1802–3 traveled in Europe, was aid-de-camp to the governor of Virginia during the war of 1812; commanded the defenses of Norfolk in 1813, with the the rank of brig.gen.; was a member of the legislature from 1810 to 1817, and chairman of the committee of finance in 1816, when he introduced the bill to incorporate the Chesapeake and Ohio canal company; was elected to congress as a federalist in 1816, and remained a member of that body until 1840. In 1853 he visited Europe, and conferred with leading men of different countries in regard to measures for the complete abolition of the foreign slave-trade. He was a leading advocate of the protection of home manufactures. Died at Howard, near Alexandria.

MERCER, HUGH, 1721-77; b. in Aberdeen, Scotland; educated at the university there; entered the medical profession, and served as assistant-surgeon in the army of prince Charles Edward, the "young pretender," in 1743. The insurrection proving a failure, he emigrated to America in 1747, settling as a physician near the present town of Mercersburg, Penn. He served as a volunteer in Braddock's campaign, was appointed capt., and so severely wounded in the battle on the Monongahela that he was unable to keep up with the other fugitives from that disastrous field, wandered for several weeks alone in the forest, until at last he reached fort Cumberland, 100 m. from the point of departure. For his courage in this expedition he received a medal from the city of Philadelphia. In 1758 he was promoted to the rank of lieut.col., accompanied gen. Forbes to fort Duquesne, now Pittsburg, and commanded the post for some time. After this he settled as a physician in Fredericksburg, Va., but entered zealously into the revolutionary conflict. He organized and drilled the minute-men of Virginia in 1775, and

the militia in 1776, and at Washington's request was chosen a brig.gen. by congress June 5, 1776. He commanded a column in the attack on Trenton, and led the advance in the night march on Princeton, which he had himself advised. Early in the battle there he was mortally wounded and left for dead on the field. Being discovered alive, he was taken to a neighboring farm-house, where he expired in the arms of maj. Lewis, his aid-de-camp. His funeral in Philadelphia is said to have been attended by 30,000 people, and a monument to his memory was erected at Laurel Hill cemetery in 1840. His son, HUGH, was educated at the expense of the nation.

MERCER, JESSE, 1769–1841; b. Halifax co., N. C. After removing to Georgia he was ordained to the ministry in the Baptist denomination, and became pastor of a church in Wilkes co. in 1789. He was a popular and useful preacher. He took a prominent part in the constitutional convention in 1798. He founded an institution named Mercer university, which at first was at Pennfield, but was removed to Macon, Ga., and is prosperous. He published a collection of hymns entitled *Mercer's Cluster*, generally used in the southern Baptist churches; *History of the Georgia Baptist Association;* and edited for several years the *Christian Index* of Georgia.

MERCER, JOHN FRANCIS, 1758–1821; b. Va.; educated at William and Mary college; served in the continental congress 1782–85, and was a delegate from Maryland to the convention which formed the federal constitution, which he refused to sign. He was a member of congress from Maryland 1792–94, and governor of that state 1801–3. He also served in the state legislature.

MERCERSBURG, a borough in Franklin co., Penn., at the terminus of a branch of the Cumberland Valley railroad, 15 m. s.w. from Chambersburg, and 62 m. s.w. from Harrisburg. The theological seminary of the German Reformed church, commenced at Carlisle, Penn., in 1825 and removed to York four years later, was, in 1835, located at Mercersburg, where it continued until its removal in 1871 to Lancaster. The high school, commenced by the same denomination at York in 1830, was removed to Mercersburg in 1835; and having, under a charter from the state, become Marshall college, remained there until 1853, when it was removed to Lancaster and combined with Franklin college under the name of Franklin and Marshall college. Mercersburg college was organized 1865, under the care of the German Reformed church, and the theological department was added in 1872.

MERCERSBURG THEOLOGY is the name given to a philosophical representation of Christian doctrine emanating from the theological seminary of the German Reformed church formerly located at Mercersburg, Penn., and especially from Dr. John W. Nevin, one of the professors there. Critical students of theology regard it as presenting substantially Schleiermacher's views modified by American habits of thought and by faith in the inspiration of the Scriptures. It has its starting point in a peculiar psychological theory concerning the person of Christ and the nature of man. This theory determines the views expressed—

I. *Concerning the person of Christ.* Dr. Nevin says that he had not one life of the body and another of the soul; nor one life of his humanity and another of his divinity. It is one life throughout, and it is in all respects a true human life. Christ is the archetypal man in whom the true idea of humanity is brought to view. He is the ideal man in whom only human nature is complete. The writers of the *Mercersburg Review* teach that the incarnation is the proper completion of humanity and that the glorification of Christ was the full advancement of our human nature itself to the power of a divine life.

II. *Concerning human nature.* "The world in its lower view is not simply the outward theater or stage on which man is set to act his part as a candidate for heaven. In the widest of its different forms of existence it is pervaded throughout with the power of a single life, which comes ultimately to its full sense and force only in the human person." The world is an organic whole which completes itself in man; and humanity is regarded throughout as a single grand fact which is brought to pass not at once, but in the way of history, unfolding always more its true interior sense, and reaching on to its final consummation. It is a universal property of life to unfold itself from within, by a self-organizing power, towards a certain end, which end is its own realization, or, in other words, the actual exhibition and actualization in outward form of all the elements, functions, powers, and capacities which potentially it includes. Thus life may be said to be all at its commencement which it can become in the end. Humanity is defined to be a generic life. Man is the manifestation of this generic life in connection with a special corporeal organization, by which it is individualized and becomes personal. It was this generic humanity which sinned in Adam, and thenceforth was corrupt in all the individual men in whom it was manifested. It was this generic humanity which Christ assumed into personal union with his divinity, not as two distinct substances, but so united as to become one generic human life. This purified humanity now develops itself by an inward force in the church, just as from Adam generic humanity was developed in his posterity. It is still, however, assumed as the fundamental idea of the gospel that God and man in Christ are one. This generic humanity is only a form of the life of God. And as to its sinning in Adam, and being thenceforth corrupt, sin and corruption are only imperfect development. God, the universal life principle, as Dr. Nevin calls it, so variously manifested in the different existences of this world, is imperfectly or insuf-

ficiently manifested in man generally, but perfectly in Christ, and through him ultimately in like perfection in his people.

III. *Concerning justification.* Dr. Nevin says: "Our nature reaches after a true and real union with the nature of God as the necessary complement and consummation of its own life. The idea which it embodies can never be fully actualized under any other form. The incarnation is the proper completion of humanity. Christ is the true ideal man. The word became flesh—not a single man only as one among many, but 'flesh' or humanity in its universal conception. How else could he be the principle of a general life, the origin of a new order of existence for the human world as such? How else could the value of his mediatorial work be made over to us in a real way, by a true imputation, and not a legal fiction only?" "Christianity is a life, not only as revealed at first in Christ, but as continued also in the church. It flows over from Christ to his people, always in this form. They do not simply bear his name and acknowledge his doctrine. They are so united to him as to have part in the substance of his life itself." "By the hypostatical union of the two natures in the person of Jesus Christ, our humanity as fallen in Adam was exalted again to a new and imperishable divine life." "The object of the incarnation was to couple the human nature in real union with the logos as a permanent source of life." "The new life of which Christ is the source and organic principle is in all respects a true human life;" "not a new humanity, wholly dissevered from that of Adam, but the humanity of Adam itself, only raised to a higher character, and filled with new meaning and power, by its union with the divine nature." "Christ's life, as now described, rests not in his separate person, but passes over to his people." He communicates his own life substantially to the soul on which he acts, causing it to grow into his very nature. "This is the mystical union, the basis of our whole salvation; the only medium by which it is possible for us to have an interest in the grace of Christ under any other view." With his substance, his life, his divine human nature, thus communicated to the soul, come his merit, his holiness, his power, his glory. These are predicates of the nature which becomes ours, constituting our personal life and character. Even the resurrection is to be effected, not by the power of Christ operating *ab extra,* as when he raised Lazarus from the dead, but by a new divine element.

"The fall of Adam was the fall of the race; not simply because he represented the race, but because the race was comprehended in his person. Sin in him was sin incorporated with the inmost life of humanity, and became from this point onward an insurmountable law in the progress of its development." It was "an organic ruin, the ruin of our nature; not simply because all men are sinners, but as making all men to be sinners. The human race is not a sand heap; it is the power of a single life. Adam's sin is therefore our sin. It is imputed to us, indeed, but only because it is ours. A fallen *life* in the first place, and on the ground of this only, imputed guilt and condemnation. In order then that the race might be saved, it was necessary that a work should be wrought not beyond it, but in it. Our nature, humanity, must be healed, the power of sin, incorporated in that nature, must be destroyed. For this purpose the logos, the divine word, took our humanity into personal union with himself. As the bearer of a *fallen* humanity he must descend with it to the lowest depths of sorrow and pain. He triumphed over the evil; his passion was the world's spiritual crisis in which the principle of health came to its last struggle with the principle of disease and gained the victory. This was the atonement. When Christ died and rose, humanity died and rose in his person. Our nature was thus restored and elevated, and by receiving this renovated nature we are saved. Christ's merits are inseparable from his nature; they cannot be imputed to us, except so far as they are immanent in us. As in the case of Adam, we have his nature, and therefore his sin; so we have the nature of Christ, and therefore his righteousness. The nature we receive from Christ is a theanthropic nature. For as he is one person, his life is one. His divine nature is at the same time *human,* in the fullest sense. All that is included in him as a person—divinity, soul, and body—is embraced in his life. It is not the life of the logos, separately taken, but the life of the word made flesh, the divinity joined in personal union with our humanity, which is thus exalted to an imperishable divine life. It is a divine human life.

IV. *Concerning the church.* This being so, "the divine human nature as it exists in the person of Christ passes over to his people, thus constituting the church which is his body, the fullness of him that filleth all in all. The process is not mechanical, but organic. It takes place in the way of history, growth, regular living development." The supernatural becomes natural, and as thus made permanent and historical in the church, must, in the nature of the case, correspond with the form of the supernatural as it appeared in Christ himself. The church must have a true theanthropic character throughout. The union of the divine and human in her constitution must be inward and real, a continuous revelation of God in the flesh, exalting this last continuously into the sphere of the Spirit. The incarnation being thus progressive in the way of actual human development in the church, the church is, in very deed, the depository and continuation of the Savior's theanthropic life itself, in which powers and resources are continually at hand, involving a real intercommunion and interpenetration of the human and divine.

V. *Concerning the sacraments.* A part, at least, of these powers and resources is

lodged in the sacraments of the church, which have a real objective force contained in themselves. Our faith is needed only to make room for that force in our souls. The things signified are bound to the signs by the force of a divine appointment; so that the grace goes inseparably along with the signs, and is truly present for all who are prepared to make it their own. And while union with Christ is by regeneration, regeneration is by the church. It is by the ministrations of this living church, in which the incarnation of Christ is progressive, and by her grace-bearing sacraments that the theanthropic life of Christ is continually carried over to new individuals. The sacraments, therefore, convey and sustain the life of Christ—his divine human life. We partake not of his divinity only, but also of his true and proper humanity; not of his humanity in a separate form, nor of his flesh and blood alone, but of his whole life, as an undivided form of existence. Consequently in the Lord's supper he is present in a peculiar way, as to his entire theanthropic life; the sign and the thing signified, the visible and invisible, form one invisible presence. Unbelievers receive only the outward sign, because they have not the organ of reception for the inward grace. Yet the inward grace is there, and believers receive both—the outward sign and the one undivided theanthropic life of Christ. This gives the eucharist a peculiar and altogether extraordinary power, as providing a mode of receiving Christ to be had nowhere else. Where the way is open for it to take effect, the sacrament serves in itself to convey the life of Christ into the person of a believer.

MERCHANT COMMISSION. See COMMISSION MERCHANT; FACTOR, *ante*.

MERCHANT SHIPPING ACT of 1854 (stat. 17 and 18 Vict. c. 104), a measure which in many important respects amended, and at the same time consolidated, the law of this country relative to merchant shipping. By the merchant shipping repeal act of the same year (stat. 17 and 18 Vict. c. 120), the statutes relative to merchant shipping previously in force were, with one or two unimportant exceptions, repealed; the new act, which formed an almost complete code of the laws affecting merchant-ships, coming in their place. No fewer than nine acts have since been passed, some amending, others supplementing, the act of 1854—viz., the merchant shipping act amendment acts, 1855 and 1862 (18 and 19 Vict. c. 91, and 25 and 26 Vict. c. 93); the merchant shipping act, 1867 (30 and 31 Vict. c. 124); the colonial shipping act, 1868 (31 and 32 Vict. c. 129); the merchant shipping (colonial) act, 1869 (32 and 33 Vict. c. 11); the merchant shipping act, 1871 (34 and 35 Vict. c. 110); the merchant shipping act, 1872 (35 and 36 Vict. c. 73); the merchant shipping act, 1873 (36 and 37 Vict. c. 85); the merchant shipping act, 1875 (38 and 39 Vict. c. 88). A bill to consolidate and amend the law relating to merchant shipping has been brought before the house of commons, but has not been proceeded with. The act of 1854 is divided into 11 parts; and the principal provisions of the amendment acts are referred to the part of the principal act to which they severally belong, so as to facilitate the reading the acts conjointly. The act of 1867, with the exception of two unimportant clauses, is occupied with a single subject—the enforcement of proper sanitary conditions on board ships. The acts of 1868 and 1869, relating to colonial shipping, are not of general importance.

The general superintendence of matters relating to merchant ships and seamen is, by the act of 1854, part I., intrusted to the board of trade, which is invested with powers for compelling local bodies, and shipowners or shipmasters, to perform the duties which the shipping acts impose upon them.

British ships, their ownership, measurement, and registry, is the subject of part II. of the act of 1854. And it is provided that no ship shall be deemed a British ship unless she belong wholly to owners who are of one of the following descriptions: 1. Natural-born subjects; 2. Persons made denizens, or persons naturalized in terms of an act of parliament, or an act of the legislative authority of some British possession; 3. Bodies corporate established under, subject to the laws of, and having their principal place of business in the United Kingdom or some British possession. Every British ship, with a few unimportant exceptions, must be registered; and a ship, unless registered, though subject to all the ordinary liabilities, is not to be recognized as a British ship. The registration is to be made by the principal officer of customs for the time being at any port or place in the United Kingdom approved by the board of trade for the registry of ships, and by certain specified officers in the colonies and possessions abroad. The registration is to comprise the name of the ship, which cannot afterwards be changed without permission of the board of trade, and the names and descriptions of the owners; also the tonnage, as ascertained by specified rules, the build, and description of the vessel, the particulars of her origin, and the name of the master. A certificate of registry, containing all the particulars registered, is given by the registrar to the master. On this certificate, changes in the ownership and changes of the master are indorsed as they occur; and a new certificate may be granted, after certain formalities, in exchange for a former one, or in the event of a former certificate being lost. The master is the person entitled to the custody of this document, and it is a penal offense to detain it from him, upon whatever pretense of right or title. The certificate is given up to the registrar on the ship being lost, or ceasing to be British. The acts of 1871, 1873, and 1875 require certain particulars to be marked on ships in specified ways—viz., the name, the official number, the registered tonnage, a scale denoting the draught of water, the deck-line, and the load-line; and besides

that there are penalties for defacing, or not maintaining such marks, and for making them inaccurately, the ship may be detained until the requirements of the law are complied with. In any case or class of cases, the board of trade may direct that the draught of water, and also the extent of the clear side of a sea-going ship be recorded by the officers of customs, and the record preserved, and also marked in the official log-book. The act of 1873 provides that where a British ship has ceased, for any reason other than capture or transference to a foreign owner, to be registered, she shall not be again put upon the register without a survey to test whether she is seaworthy.

The property in every ship is, for purposes of registration, divided into sixty-four shares. No person is entitled to be registered as owner of any fractional part of a share; but any number of persons not exceeding five may be registered as joint-owners of a share. Counting joint-owners, who are not entitled to dispose in severalty of their respective interests, as constituting one person only, not more than thirty-two persons can be registered at the same time as owners of a ship. The power of disposing of the ship or its shares is vested exclusively in registered owners. Notwithstanding this, persons beneficially or equitably interested are to have their interests protected upon application to the proper court. When a registered ship, or any share therein, is disposed of to persons qualified to be owners of British ships, the transfer must be made by a bill of sale under seal, according to a form prescribed, and the names of the transferees are to be entered on the register as owners of the ship or share. Mortgages also must be in a form prescribed, and are to be recorded by the registrar upon production to him in each case of the mortgage deed.

In part III., under the heading "masters and seamen," it is provided that local marine boards shall be established at certain ports of the United Kingdom; and that each of these shall consist of 2 *ex officio* members—the mayor or provost, and the stipendiary magistrate of the place—4 members appointed by the board of trade, and 6 elected annually by the owners of foreign-going ships and of home-trade passenger-ships. The local marine board is required to establish an office (called the shipping office in the act of 1854, but now, under the act of 1862, called the mercantile marine office) or offices, under the management of a superintendent (originally called shipping-master), whose duty it is to afford facilities for engaging seamen, by keeping registries of their names and character; to superintend and facilitate their engagement and discharge; to provide means for securing the presence on board at the proper time of men who are so engaged; to facilitate the making of apprentice-ships to the sea-service; and to perform such other duties relating to merchant-seamen and merchant-ships as shall be committed to them by the board of trade. The local marine boards are also required to hold examinations for persons who intend to become masters or mates of foreign-going ships or home-trade passenger-ships. And no person can be employed in a foreign-going ship as master, or first, or second, or only mate, or in a home-trade passenger-ship as master, or first or only mate, unless he holds a certificate of competency obtained at such an examination; or else a certificate of service obtained in virtue of his having held a certain rank in the royal navy, or certain employment in the merchant service previous to the passing of the act of 1854, as specified in the act. The act of 1862 extended the requirement of a certificate from the board of trade to engineers employed in steamships. There are first and second class engineers' certificates, and an engineer cannot be employed unless he holds the one or the other—according to his employment and the engine-power of the ship—obtained at an examination, or else in consideration of his service previous to 1862, or of the rank he has held in the royal navy.

The master of every ship, excepting ships of less than 80 tons burden, exclusively employed in the coasting-trade, is required to enter into an agreement—in a form prescribed by the board of trade—with every seaman whom he takes to sea from any part of the United Kingdom. This document, which must be signed by the master and by the seamen, sets forth the nature and duration of the voyage; the number and description of the crew; the time at which each seaman is to be on board, or to begin work; the capacity in which he is to serve; the amount of his wages; a scale of provisions; regulations as to conduct; and such punishments for misconduct as the board of trade shall have sanctioned, and as the parties shall have agreed to adopt. In the case of foreign-going ships, the agreement must be made before, and be attested by the superintendent of the mercantile marine office; and seamen engaged abroad must be engaged, if at a colonial port, in the presence of a shipping-master or customs officer; if at a foreign port, in the presence of the consul. The discharge of the crews of foreign-going ships must be made at the mercantile marine office before the superintendent, to whom the ship-master must deliver a full account of the wages due to each seaman, and of all deductions made from them. It is enacted that no right to wages shall be dependent on the earning of freight; and that every stipulation on the part of the seaman for abandoning his right to wages in the event of the loss of the ship, shall be inoperative. Previous to 1872, time agreements with seamen in home-trade ships could not be made for a longer period than 6 months. This provision was repealed by the act of that year. The act of 1873 provided that in an agreement with seamen, it should only be necessary to state the maximum period which the agreement is to cover, and the places or parts of the world, if any, to which the voyage is not to extend. Some provision was made in the act of 1854 as to the amount of space to be set apart for the accommodation of every seaman,

as to the maintenance of the sleeping-places in a proper state of order and ventilation, and as to the supply of medicines for the voyage; but the clauses of that act relating to these subjects have been repealed, and fuller provision for them has been made by the act of 1867. In this act, special precautions have been taken to insure that ships take to sea with them a sufficient supply of lime-juice and other anti-scorbutics; and the local marine boards are empowered to appoint medical inspectors to examine seamen applying for employment, if the ship-master desires it.

The act of 1854 provided for the establishment in the port of London of a general register and record office for seamen, under the management of a registrar-general of seamen; and required returns to be made to this official by the officers of customs, and through superintendents of mercantile marine offices, by masters of ships both in the home and in the foreign trade, from which a general view might be had as to the state of our mercantile marine. Official log-books, in forms prescribed, are required to be kept in every ship, other than those exclusively employed in the coasting-trade, either in connection with or distinct from the ordinary log-book; and in these, entries must be made of numerous specified occurrences. Provision is made for the punishment of offenses against discipline and good-conduct committed either by seamen or by ship-masters, and for the trial in this country of persons charged with any crime committed upon the high seas. The act of 1871 provides that where seamen are charged with deserting or refusing to join a ship, or refusing to go to sea, and a fourth of the crew, or 5 or more of the crew, if the number of the crew is 20, allege that the ship is from any cause, as unseaworthiness, overloading, improper loading, or defective equipment, not in a fit condition to proceed to sea, or that the accommodation of the ship is insufficient, the court before which they are charged may order the ship to be surveyed, and unless the opinions of the surveyor be disproved, shall act upon them; the ship-owner or the accused paying the cost of the survey, according as the defense is sustained or overruled. Where the defense is sustained, the court may, under the act of 1873, make an order for compensation to be paid by the ship-owner or ship-master to the seamen. The board of trade may suspend or cancel the certificate (whether of competency or of service) of any master or mate (1) if, after investigation, he is reported to be incompetent, or to have been guilty of any gross act of misconduct, drunkenness, or tyranny; (2) if, after investigation, it is reported that the loss or abandonment of, or serious damage to any ship, or loss of life, has been caused by his wrongful act or default; (3) if he is superseded by the order of any admiralty court, or naval court held abroad under the provisions of the act; or (4) if he is shown to have been convicted of any offense.

In Part IV., under the head of "Safety and Prevention of Accidents," rules are laid down as to the boats and life-buoys which are to be carried by sea-going ships; and it is provided that the officers of customs shall not grant a clearance to any vessel by which those rules have not been complied with. As to the use of lights and fog-signals on board ships at sea, the regulations now in force are contained in the schedules of the act of 1862; where is also laid down the rule of the road for preventing collisions between ships meeting each other at sea. Under the acts of 1871 and 1873, ships which come into collision are required to exchange names, and give other information necessary for identification; and if, after the collision, one of the vessels does not stay by and give assistance to the other, it is deemed to have been in the wrong. The person in charge of it may be prosecuted for a misdemeanor, and have his certificate canceled. Wherever one of two vessels which have been in collision has infringed the regulations of the shipping acts, it is to be deemed in the wrong unless circumstances are adduced which disprove this presumption. Certain stringent provisions are made as to the build and equipment, and also as to the surveying and certificating of steamships. The act of 1872, which transfers to the board of trade the powers exercised under the passenger acts by the emigration commissioners, and, in certain cases, by the home secretary, requires that passenger steamers should undergo survey at least once a year. Under the acts of 1871, 1873, and 1875, the board of trade is enabled, either on the information of complainants, or of its own motion, to order any vessel to be surveyed, and after survey to declare it unseaworthy, and to make an order for its detention, or for its release, only on the fulfillment of such conditions as the board may prescribe. The owner or master of the vessel must be furnished with a copy of the surveyor's report on which the order of the board of trade has proceeded, and he may appeal to the local court having admiralty jurisdiction, the decision of which is final. The owner of a vessel detained pays the cost of the survey, and the complainant whose case has not been substantiated pays the cost of the survey, and is liable in compensation to the owner of the vessel; the board of trade also is liable in compensation to the owner when it has acted of its own motion, and unseaworthiness has not been established. The act of 1875 also contains the following provision (s. 4): "Every person who sends to sea, or is a party to any attempt to do so, and every master who knowingly takes to sea, a ship in such unseaworthy state, that the life of any person would be likely to be thereby endangered, shall be guilty of a misdemeanor. Burden laid on the accused of proving that he did all he could to insure seaworthiness, or the ship going to sea in such unseaworthy state was, in the circumstances, reasonable and justifiable." Any person prosecuted under this provision is enabled to give evidence on his own behalf. The act of 1873 contains provisions as to

the carriage of dangerous goods, and goods suspected of being dangerous; and the act of 1875 provides for the carrying of grain.

For the provisions as to pilotage, in Part V., we refer to the acts themselves. See also PILOT.

Part VI. deals with the subject of light-houses. See LIGHT-HOUSE; TRINITY HOUSE; and NORTHERN LIGHT-HOUSES.

Part VII. relates to the mercantile marine fund.

Part VIII. makes provision for cases of wreck, casualties, and salvage. An inquiry is to be made whenever any ship is lost, abandoned, or materially damaged on or near the coasts of the United Kingdom; or causes loss or material damage to any other ship on or near such coasts; whenever, by reason of any casualty on board of any ship, on or near such coasts, loss of life ensues; and whenever any such loss, abandonment, damage, or casualty happens elsewhere, and any competent witnesses thereof arrive at any place in the United Kingdom. This inquiry is to be made by the inspecting officer of the coast-guard, or the principal officer of customs of the place at which the occurrence in question happened, or of the place at which competent witnesses of it arrive, if it has happened abroad, or can be conveniently examined; or by some other person appointed for the purpose by the board of trade. Such officer or person, if he thinks fit, or if the board of trade so directs, may have the matter formally investigated before two justices or a stipendiary magistrate; and the board of trade may appoint some person of nautical skill and knowledge to act as assessor to such justices or magistrate. If the conduct of any master or mate is in question, the magistrates may require him to deliver up his certificate pending the inquiry; and the certificate may be canceled or suspended by the board of trade upon their report. The board of trade has the general superintendence of all matters relating to wreck, and has power to appoint a receiver of wreck in any district.

Part IX. relates to the liability of ship-owners; and the provisions of the principal act have here been materially altered by the act of 1862. Under the act of 1862, the owners of any ship, whether British or foreign, are not answerable in damages for any loss of life or personal injury to persons carried in the ship; for any damage or loss caused to any goods on board the ship; for any loss of life or personal injury by reason of the improper navigation of the ship caused to any person carried in any other ship; or for any loss or damage similarly caused to any other ship, or the goods on board of it, when such loss, or injury, or damage happens without their actual fault or privity, except as follows: Where loss of life or personal injury has occurred either alone or together with loss or damage to ships and merchandise, they are liable to the extent of £15 for each ton of the ship's tonnage; where there is loss or damage only of ships or merchandise, they are liable to the extent of £8 per ton. The tonnage, on account of which the liability in these cases is to be calculated, is, in the case of sailing-ships, the registered tonnage, and, in the case of steamships, the gross tonnage, without deduction on account of the engine-room; and the tonnage of foreign ships is to be estimated according to the rules of measurement laid down for British ships. The act of 1854, however, provided that the owners of sea-going ships should be liable in respect of every loss of life, personal injury, loss of or damage to goods which may arise on distinct occasions, to the same extent as if no other loss, injury, or damage had arisen; and this provision is still in force. In cases of loss of life or personal injury, the act of 1854 empowers the board of trade to institute an inquiry, and provides in detail for the recovery of damages before the sheriff and a jury. The damages are to be assessed at not more than £30 for each case of death or personal injury. These are to be paid to her majesty's paymaster-general, and to be distributed by him as the board of trade directs; the board having power to direct payment of such compensation, not exceeding the statutory amount, as may be thought fit. A person dissatisfied with the amount of damages awarded to him may bring his action in the ordinary courts, but he is liable in the costs of the action unless he recover a sum exceeding double the statutory amount.

Part X. of the act of 1854 lays down the legal procedure to be taken in cases arising under the act; and part XI. deals with several miscellaneous matters of no general importance. The act of 1862 provided that foreign ships within British jurisdiction shall be subject to the rules for preventing collisions applicable to British ships. The final issue of Mr. Plimsoll's indefatigable labors was the passing of the act to amend the merchant shipping acts, which became law in Aug., 1876. Here provision is made for the detection of unseaworthy ships, to prevent overloading, to secure that all deck cargoes shall be included in the tonnage, and that grain cargoes shall not be carried loose in bulk, but shall be kept from shifting either by boards or bulkheads or by being carried in sacks. The act of 1873 provides for the application, by order in council, of all the provisions of the merchant shipping acts to foreign vessels, the states to which they belong assenting. The act of 1862 contains the law on the subject of delivery of goods and lien for freight (for which see LIEN).

MERCHANTS' MARKS. In the middle ages it was the practice for merchants, traders, and others to whom the proper use of heraldry was not conceded, to be allowed by the heralds to bear devices indicative of their trades or occupations. A cutler might bear

his knife, a tailor his shears, a mason his trowel and compasses. These insignia were in strictness ordered to be borne only in "targets hollow at the chief flankes," yet we often find them on shields, and sometimes even impaled and quartered with arms. Merchants, along with a monogram of their initials, often bore a mark composed of a cross and a figure resembling the Arabic numeral 4 turned backwards—perhaps a symbol of the Holy Trinity, though it has also been explained to represent the mast and yard of a ship. The insignia of their companies were frequently borne by merchants in a chief above their marks, and occasionally quartered with them. These merchants' marks were probably the origin of the trade brands and marks of our own time. Many of them are to be seen sculptured on the walls and roofs of the churches of the 14th c. and 15th c., and engraved on monumental brasses both in England and on the continent. Seals with merchants' marks are occasionally found appended to conveyances of land.

MER'CIA. See HEPTARCHY.

MERCURY. See HERMES.

MERCURY, planet. See SOLAR SYSTEM, *ante*.

MERCURY, or QUICKSILVER (symb. Hg, equiv. 100—new system, 200—sp. gr. 13.6), one of the so-called noble metals, remarkable as being the only metal that is fluid at ordinary temperatures. It is of a silvery white color, with a striking metallic luster. When pure, it runs in small spherical drops over smooth surfaces; but when not perfectly pure, the drops assume an elongated or *tailed* form, and often leave a gray stain on the surface of glass or porcelain. Moreover, the pure metal, when shaken with air, presents no change upon its surface; while, if impure, it becomes covered with a gray film. It is slightly volatile at ordinary temperatures, and at 662° it boils, and forms a colorless vapor of sp. gr. 6.976. Hence it is capable of being distilled; and the fact of its being somewhat volatile at ordinary temperatures, helps to explain its pernicious effects upon those whose trades require them to come much in contact with it—as, for example, the makers of barometers, looking-glasses, etc. At a temperature of −39°, it freezes, when it contracts considerably, and becomes malleable. In consequence of the uniform rate at which it expands when heated, from considerably below 0° to above 300°, it is employed in the construction of the mercurial thermometer.

All mercurial compounds are either volatilized or decomposed by heat; and when heated with carbonate of soda, they yield metallic mercury. Native or virgin quicksilver only occurs in small quantity, usually in cavities of mercurial ores. Of these ores, by far the most important is *cinnabar* (q.v.). There are two means of obtaining the metal from the cinnabar: the ore may be burned in a furnace, in which case the sulphur is given off as sulphurous acid, and the mercury is collected in a condensing chamber; or the ore may be distilled with some substance capable of combining with the sulphur—as, for example, with slaked lime or iron filings.

The mercury imported into this country is usually almost chemically pure. If the presence of other metals is suspected, it may be pressed through leather, re-distilled, and then digested for a few days in dilute cold nitric acid, which exerts little action on the mercury, if more oxidizable metals are present. The mercury, after being freed from the nitric acid by washing with water, is chemically pure.

There are two oxides of mercury, the black suboxide (Hg_2O) and the red oxide (HgO). Both of these lose all their oxygen when heated, and form salts with acids. The *black suboxide*, although a powerful base, is very unstable when isolated, being readily converted by gentle warmth, or even by mere exposure to light, into red oxide and the metal ($Hg_2O = HgO + Hg$). The most important of its salts is the nitrate ($Hg_2O, NO_5 + 2Aq$), from whose watery solution ammonia throws down a black precipitate known in pharmacy as *mercurius solubilis Hahnemanni*, from its discoverer, and consisting essentially of the black suboxide with some ammonia and nitric acid, which are apparently in combination. Of the *red oxide*, the most important salts are the nitrate ($HgO, NO_5 + 8Aq$); the sulphate (HgO, SO_3), which is employed in the manufacture of corrosive sublimate; and the basic sulphate ($3HgO, SO_3$), which is of a yellow color, and is known as *turpeth mineral*.

The haloid salts of mercury correspond in their composition to the oxides. Of the most important of these—the chlorides—there are the subchloride (Hg_2Cl), well known as calomel (q.v.), and the chloride (HgCl), or corrosive sublimate.

The *chloride* (formerly termed the bichloride, when calomel was regarded as the protochloride, and the equivalent of Hg was regarded as 200 instead of 100), when crystallized from a watery solution, occurs in long white glistening prisms; but when obtained by sublimation, it occurs in white transparent heavy masses, which have a crystalline fracture, and chink with a peculiar metallic sound against the sides of the bottle in which they are contained. This salt melts at 509°, and volatilizes unchanged at about 570°. It has an acrid metallic taste. It is soluble in 16 parts of cold, and in less than three parts of boiling water, and dissolves very freely in alcohol and in ether. Corrosive sublimate enters into combination with the alkaline chlorides, forming numerous distinct compounds. (A double chloride of ammonium and mercury, represented by the formula $3H_4NCl, HgCl + Aq$, has been long known as *sal alembroth*.) It combines with oxide of mercury in various proportions, forming a class of compounds of great interest in theoretical chemistry, termed *oxychlorides of mercury*. On adding a solution of corrosive sub-

limate to a solution of ammonia in excess, a compound, which, from its physical characters, is termed *white precipitate*, is thrown down, which is generally supposed to be a compound of chloride with amide of mercury, $HgCl.HgNH_2$ (Kane). Chloride of mercury coagulates albumen, and combines with the albuminous tissues generally, forming sparingly soluble compounds. Hence, in cases of poisoning with the salt, the white of raw eggs is the best antidote; and for the same reason corrosive sublimate is a powerful antiseptic, and is employed to preserve anatomical preparations.

Amongst the most important tests for this substance, which is not unfrequently used as a poison, may be mentioned—1. Iodide of potassium, which, when added to a crystal or to a watery solution of chloride of mercury, gives rise to the formation of a bright scarlet iodide of mercury. 2. The galvanic test, which may be applied in various ways, of which the simplest is the "guinea and key test," devised by Wollaston. He placed a drop of the fluid suspected to contain corrosive sublimate on a guinea, and simultaneously touched it and the surface of the guinea with an iron key; metallic mercury was deposited on the gold in a bright silvery stain. 3. Precipitation on copper, and reduction. To apply this test, we acidulate the suspected fluid with a few drops of hydrochloric acid, and introduce a little fine copper gauze, which soon becomes coated with mercury. On heating the gauze in a reduction tube, the mercury is obtained in well-defined globules.

With iodine and bromine, mercury forms two iodides and bromides, corresponding in composition to the chlorides. Both the iodides are used in medicine; the bromides are of no practical importance. The *subiodide* (Hg_2I) is a green powder formed by triturating 5 parts of iodine with 8 of mercury, and is of far less interest than the *iodide* (HgI), which is most simply obtained by precipitating a solution of corrosive sublimate by a solution of iodide of potassium. The precipitate is at first salmon-colored, but soon changes into a brilliant scarlet crystalline deposit.

Sulphur forms two compounds with mercury—viz., a subsulphide (Hg_2S), a black powder of little importance, and a sulphide (HgS), which occurs naturally as cinnabar (q.v.). *Sulphide of mercury* is thrown down as a black precipitate by passing sulphureted hydrogen through a solution of a persalt of mercury (corrosive sublimate, for example). When dried and sublimed in vessels from which the air is excluded, it assumes its ordinary red color. The well-known pigment *vermilion* is sulphide of mercury, and is sometimes obtained from pure cinnabar, but is more frequently an artificial product.

Mercury unites with most metals to form amalgams (q.v.), several of which are employed in the arts.

Of the numerous organic compounds of mercury, it is unnecessary to mention more than the fulminate (described in the article FULMINIC ACID (q.v.), and the cyanide (HgCy), which may be prepared by dissolving the red oxide of mercury in hydrocyanic acid, and is the best source from which to obtain cyanogen.

The uses of mercury are so numerous that a very brief allusion to the most important of these must suffice. It is employed extensively in the extraction of gold and silver from their ores by the process of amalgamation. Its amalgams are largely employed in the processes of silvering and gilding, and some (as those of copper and cadmium) are employed by the dentist for stopping teeth. It is indispensable in the construction of philosophical instruments, and in the laboratory in the form of the mercurial bath, etc. It is the source of the valuable pigment vermilion. The use of its chloride in anatomical preparations has been already noticed; it is similarly found that wood, cordage, and canvas, if *soaked* in a solution of this salt (1 part to 60 or 80 of water), are better able to resist decay when exposed to the combined destructive influence of air and moisture. The uses of mercury and its preparations in medicine are noticed in a separate article.

MERCURY AND **MERCURIALS**, MEDICINAL USES OF. Liquid mercury is no longer used in medicine, although, until lately, it was occasionally given with the view of overcoming, by its weight, obstructions in the intestinal canal. There are, however, many preparations which owe their value to *extinguished* mercury; that is to say, to mercury triturated with chalk, saccharoid matters, oil, etc., till globules can no longer be detected in it. It is possible that, in these cases, the metal is partly reduced to the state of suboxide. Amongst these preparations must be placed *mercury with chalk*, or *gray powder* (*hydrargyrum cum creta*), which is the mildest and best mercurial to administer to infants and children, the dose varying with the age; *blue pill* (q.v.); and the various ointments, liniments, and plasters of mercury. *Calomel* (termed, in some of the pharmacopœias, *hydrargyri chloridum*, for the same reason that corrosive sublimate, as already mentioned, is termed in the same works *hydrargyri bichloridum*) is perhaps more given than any other medicine of this class, and may be regarded, in so far as its actions are concerned, as a type of mercurials generally. Given in small doses, the first effects of these medicines are observed in the increase of the various secretions, as, for instance, of the saliva (see SALIVATION), of the various fluids poured into the intestinal canal,* and sometimes

* It is very doubtful whether, as is generally believed, mercurials increase the secretion of the essential constituents of the bile. The watery portion is undoubtedly, and the coloring matter probably, increased.

of the urine. When continued in small doses for some time, they cause the absorption of morbid fluids, and even of morbid products that have assumed a partially solid form. The following are some of the diseases in which they are of most importance: (1) In *internal congestions*, as of the liver, etc., to increase the secretions, and hence relieve the vessels of the affected organ; (2) in various *acute inflammations*, especially of serous membranes (q.v.), of the structure of the liver and of the lungs, etc.; (3) in numerous forms of *chronic inflammation;* (4) in *dropsies*, dependent upon inflammation of serous membranes or disease of the liver, but not in dropsy from disease of the kidneys, where they are generally injurious; (5) in numerous *chronic affections* in which an alterative action is required; and (6) as a purgative (to be followed by a black draught), when a patient is in the condition popularly known as bilious (in this case, blue pill is usually as efficacious as calomel).

In *syphilis*, mercurials were at one time universally prescribed; now they are not considered essential to the cure of this disease, except in comparatively few cases.

If calomel, blue pill, or any other mercurial be given in too large a dose, or for too long a period, most serious consequences may result—such as very profuse salivation, with swelling of the tongue and gums, and loosening of the teeth; purging; certain skin affections; disease of the periosteum and of the bones (formerly ascribed to syphilis, but in reality oftener due to the supposed remedy); and a low febrile condition (termed mercurial erythism), accompanied with great general prostration.

The doses of calomel for an adult vary from 3 to 6 grains when taken as a purgative. If the object is to affect the system generally, as in a case of acute inflammation, small doses (half a grain to two grains, combined with a little opium) should be given several times a day; while as an alterative, still smaller doses (not sufficient at all to affect the mouth) should be prescribed. The *compound calomel pill* popularly known as *Plummer's pill* (in which the calomel is associated with oxysulphide of antimony and guaiacum) is a most valuable alterative in chronic skin-diseases—a five-grain pill to be taken every night.

Corrosive sublimate (the *bichloride* of the pharmacopœias, and *oxymuriate* of the older chemists), although a very powerful irritant poison, is extremely useful in very small doses as an alterative in many chronic affections of the nervous system, the skin, etc. The dose varies from one-thirtieth to one-eighth of a grain; the average dose of its pharmacopœial solution, the *liquor hydrargyri bichloridi*, being one dram, which contains one-sixteenth of a grain of the salt. This medicine should always be given on a full stomach.

The above are the chief mercurial preparations that are given internally. Certain external applications require a few remarks. The plasters, ointments, and liniments are absorbed by the skin, and act in the same manner as mercurials taken internally.

White precipitate ointment is the universal remedy for the destruction of lice, and is a useful stimulating application in chronic skin-diseases. *Ointment of nitrate of mercury*, popularly known from its yellow color as *citrine*, or *golden ointment*, is, when sufficiently diluted a most useful stimulating application in inflammation of the eyelids, in indolent ulcers, etc.; and the *ointment of nitric oxide of mercury* is similar in its action. The precipitated suboxide that occurs in *black wash*, and its use as a local application, are described in the article LINIMENTS.

The *toxicological* relations of the mercurial compounds must be briefly glanced at. There are cases on record in which, probably from some peculiarity of constitution, ordinary and even small doses of the milder mercurials have caused death; thus, Christison mentions a case in which two grains of calomel destroyed life by severe salivation and by ulceration of the throat; and similar cases in which small doses of gray powder, blue pill, and calomel have proved fatal are recorded by Taylor in his *Medical Jurisprudence*. The preparations employed for the purpose of poisoning are mainly corrosive sublimate and white and red precipitates, corrosive sublimate being used in at least four-fifths of the cases. The symptoms produced by a poisonous dose of this salt come on immediately, there being during the act of swallowing an intense feeling of constriction, and a burning heat in the throat, while a metallic taste is left in the mouth. Violent pain in the stomach and abdomen is felt in a few minutes, and vomiting of mucus and blood, and purging, follow. The pulse becomes small, frequent, and irregular, the tongue white and shriveled, the skin cold and clammy, the respiration difficult, and death is preceded by fainting or convulsions. Any dose exceeding two grains would probably prove fatal to an adult, unless vomiting were induced, or the whites of eggs administered. Death commonly ensues in from one to five days, but may take place in less than half an hour, or not for three weeks or more.

MERCURY, Dog's, *Mercurialis*, a genus of plants of the natural order *euphorbiaceæ*, having unisexual flowers, a tripartite perianth, 9 to 12 stamens, two simple styles, and a dry two-celled fruit with two seeds. The species are not numerous. The COMMON DOG MERCURY (*M. perennis*) is very common in woods and shady places in Britain. It has a perfectly simple stem, about a foot high, with rough ovate leaves, and axillary loose spikes of greenish flowers. It turns a glaucous black color in drying, and the root contains two coloring substances, one blue and the other carmine; so that it may probably become of importance in dyeing. It is very poisonous. The mercury which some old writers mention

as a pot-herb is not this plant, but *chenopodium bonus henricus*. ANNUAL DOG MERCURY (*M. annua*) is a much rarer British plant, and less poisonous. The leaves are indeed eaten in Germany, as spinach. A half-shrubby species (*M. tomentosa*), found in the countries near the Mediterranean, has enjoyed an extraordinary reputation from ancient times; the absurd belief mentioned by Pliny being still retained, that if a woman after conception drink the juice of the male plant she will give birth to a boy, and if of the female plant her offspring will be a girl—the male plant, however, being mistaken for the female, and the female for the male.

MERCY, SISTERS OF, or ORDER OF OUR LADY OF MERCY, an order of the Roman Catholic church founded in Dublin in 1827. They are of two classes, choir sisters and lay sisters; the choir sisters being occupied with the visitation of the sick and prisoners, the care of poor and virtuous girls, and other charities; the lay sisters being employed in the domestic occupations of the convent, etc. Each community is independent of the rest of the order, being subject only to the bishops. The origin of the order was due to Miss Catharine McAuley of Dublin, who, born of Roman Catholic parents and left an orphan, having been educated as a Protestant, joined the Roman Catholic church, and devoted her life and ample fortune to the service of the poor. The order has been introduced into many parts of Ireland, England, Scotland, and America. After a preliminary preparation of six months, candidates assume the white veil and become novices. The novitiate lasts two years. Their vows bind them to poverty, chastity, obedience, and the care of the sick and poor.

MEREDITH, OWEN (*pseud.*). See BULWER-LYTTON, EDWARD ROBERT, Earl.

MEREDITH, WILLIAM MORRIS, LL.D., 1799–1873; b. Penn.; a graduate of the university of Pennsylvania at Philadelphia, class of 1812; commenced the practice of law about 1820, and became a distinguished member of the profession. He held many positions in the gift of his native state, representing his district in the legislature from 1824 to 1828, and was president of the city council of Philadelphia from 1834 to 1849. He was attorney-general of Pennsylvania from 1861 to 1867, was elected president of the Pennsylvania constitutional convention in 1857, and was U. S. secretary of the treasury under president Taylor from Mar. 7, 1849, to July 20, 1850. At the time of the Geneva conference on the Alabama question in 1871, he was offered the position of counsel for the United States, but declined.

MERES, FRANCIS, b. England, 1570; distinguished chiefly as being the author of *Wit's Academy, a Treasurie of Goulden Sentences, Similies, and Examples*, 1634. *Palladis Tamia: Wit's Treasurie, being the Second Part of Wit's Commonwealth, a Comparative Discourse of our English Poets with the Greek, Latin, and Italian Poets*, appeared in 1597. His references to Shakespeare are considered of value as showing the number of works by that author produced up to that time; in his review of the literature of the day, his criticisms are considered for the most part just. He published *God's Arithmetique*, 1597—a sermon on Eccles. v. 9. He was author of a translation of the *Sinner's Guide* by Fray Luis de Granada.

MERGANSER, *Mergus*, a genus of birds of the family *anatidæ*, having a slender, straight, much compressed bill, hooked at the tip, and notched at the edges, almost furnished with teeth. See BILL. The species are all inhabitants of the seas and coasts of northern regions, but migrate southwards in winter. The goosander (q.v.) is the largest and best known British species. The REDBREASTED MERGANSER (*M. serrator*) is plentiful in the northern parts of Britain, at least in winter, and is found in all the northern parts of the world. It is not much smaller than the goosander, which it much resembles.—The HOODED MERGANSER (*M. cucullatus*), a smaller species, only about 18 in. in entire length, is a very rare visitant of Britain, but is very plentiful in North America.

MERGER, in law, is the absorption of one right, estate, interest, or offense in another of a higher degree vesting in or committed by the same person. The doctrine of merger is most commonly brought to bear in the case of real estate. Thus, where there is no intervening estate between a greater and a less limited to the same person, the less estate is absorbed or merged in the greater. If an assignment of the mortgage is made to the mortgager, the whole estate vests in him. Or if the reversion in fee simple come to the tenant for years, either by descent or purchase, his term for years is merged in the fee. But both estates, to produce a merger, must be held by the same person, by one right, and at one time. Merger occurs either upon the meeting, in the same person, of an estate of higher and an estate of less degree, or by the meeting in the same person of the reversion and the particular estate. The inferior estate is extinguished by the merger, but the greater estate remains the same as before the merger. As a rule, whenever the legal and the equitable estates meet in one and the same person, the former absorbs the latter. But a court of equity will not allow the two interests to be merged, if such merger would be contrary to the intentions of the parties, or if, without prejudice to other parties, the legal and equitable estates can be kept apart, to the profit of the party in whom they would otherwise merge. Instances of a partial merger may occur, where an estate is merged in part, and exists in part. Thus, if a tenant for years acquire the reversion of part of the leased property, he owns part of the property leased in fee-simple, and is a

tenant as to another part. Where two estates meet in the same person but by different rights, merger will not take place.—In criminal law a less offense is merged in a greater which includes it. Thus, every assault includes a battery. But where the offenses are of an equal degree, merger will not take place. In torts, when a felony is also a tort, for which a private person may institute a civil action, the private wrong merges in the public wrong. But the merger in such cases is not complete, and, upon the conviction of the criminal, the civil remedy is revived. This rule of merger in the criminal law obtains in England, where criminal prosecutions are usually conducted by private persons, and the justification of it is to be found in the fear that criminals would not be prosecuted, if the injured person could first obtain civil satisfaction. In this country, criminal proceedings are generally conducted by public prosecutors, and the English doctrine of criminal merger does not obtain. In England itself, it applies only to actions of tort and trespass. Merger is also extended to contracts. Thus, against a debtor by specialty, the remedy for breach of an ordinary simple contract is merged in the higher remedy upon the specialty, and the creditor can resort to the latter only. So where a creditor has obtained a judgment against his debtor by contract, he can only bring suit upon the judgment, if it be unsatisfied.

MER'IAN, MARIA SIBYLLA, 1647–1717; b. Germany; daughter of Matthäus Merian, a Swiss engraver, and sister of the historical painter Matthäus Merian; had a natural talent for drawing and painting, which developed in the direction of flowers and insects. She was the pupil of Abraham Mignon, celebrated for his exquisite representations of flowers, fruit, and insects. In 1665 she married Johann Andreas Graff, a painter, and removed to Nuremburg. She was never called by her married name, more fame attaching to her own, and published, 1679–83, an illustrated work in the Dutch language, 2 vols., *Origin of Caterpillars; their Nourishment and Changes.* It was translated into Latin in 1717, published in Amsterdam with a portrait of herself engraved by Houbraken; and in 1730, a French edition appeared, entitled *Histoire Générale des Insectes de l'Europe.* In 1698 she went to Surinam, and pursued her studies in South America, remaining there until 1701, publishing the result of her labor under the title of *Generation and Transformation of Insects*, 2 vols., with colored plates, and an additional volume by one of her daughters. She had 2 daughters, Jane Helen and Dorothea Maria Henrietta, who after their mother's death gave a new edition of her work to the public. The original was published in Amsterdam in 1705. In 1768–71 all her works were published, in Paris, under the title of *Histoire des Insectes de l'Europe et de l'Amerique.* A number of her original drawings, upon vellum bound in 2 vols., noted for their skill and accuracy, are in the British museum collection among the prints, and, with a portrait of herself, were the property of sir Hans Sloane. They were purchased at a great price, and the European specimens are said to be entirely original delineations, celebrated for scrupulous exactness. There are collections of her drawings in St. Petersburg, Holland, and Frankfort. She excelled as a writer no less than in the more conspicuous professions of painter and naturalist.

MERGUI', a t. and seaport of Mergui, one of the Tenasserim provinces, British Burmah, stands on an island in the delta of the Mergui river. Lat. 12° 27′ n., long. 98° 42′ east. It is about three miles in circuit, and is surrounded by a stockade. Its harbor is spacious and secure. Exports: sapan wood, dried fish, ivory, etc. Pop. '71, 9,877.

MERGUI ARCHIPELAGO, a group of islands in the gulf of Bengal, lying off the southern shores of the Tenasserim provinces, in lat. from 9° to 13° north. The islands are mountainous, some of them rising to 3,000 ft. above sea-level. Pearls are found on the coasts of many of them; and edible birds'-nests, which are sold to the Chinese and Malays, as also timber and coal, are among the chief articles of export.

MER'IAN, MATTHÆUS, the elder, 1593–1653; b. at Bâle; lived in Paris and Frankfort. He began in 1640 a work presenting perspective views of some European cities, which were drawn, engraved, and described by himself; the work is regarded as very valuable. It was continued after his death.

MER'IDA, a state in n.w. Venezuela, bounded on the n. by Maracaybo; on the e. by Truxillo and Barinas; on the s. by Barinas and the United States of Colombia; and on the w. by Pampnora. The surface consists of elevated table-lands and valleys, between the numerous mountains, off-shoots of the Andes chain, which extend through the country in all directions. The Sierra Nevada, the highest of these mountains, rises to a height of 15,066 feet. There are many rivers and extensive lakes, among which may be mentioned the Lagunilla, 3,000 ft. above sea-level. The ordinary productions of the temperate and torrid zone are grown. Area, 10,000 sq.m.; pop. 70,000, largely Indians and Mestizos. Capital, Merida.

MER'IDA, a t. of Venezuela, South America, capital of a province of the same name, about 60 m. s. of the lake of Maracaybo. It was formerly the largest and one of the most important cities of Venezuela; but in 1812 it was almost wholly destroyed by an earthquake, from which misfortune it has somewhat recovered, and is again in a flourishing condition. Pop. 6,000.

MER'IDA, the capital of Yucatan, Mexico, is situated on a barren plain, 25 m. from the gulf of Mexico, in lat. 20° 50′ n., long. 89° 40′ west. It occupies the site of a former native city, and was founded by the Spaniards in 1542. Merida has a university, a cathedral,

and 13 churches. Its port is Sizal, with which it communicates by a good road. Its trade and manufactures are not extensive. Pop. '71, 33,025, almost all Indians and half-bloods.

MERIDA (anc. *Augusta Emerita*), a small, decayed t. of Spain, in the province of Estremadura, rises on the right bank of the Guadiana, 32 m. e. of Badajoz. It is unique in Spain, and is in some points a rival of Rome itself, on account of the number and magnitude of its remains of Roman antiquity. The Guadiana is here crossed by a Roman bridge of 81 arches, and with a length of 2,575 ft., and a breadth of 26 feet. It was erected by Trajan. There is another Roman bridge over the Albarregas, 450 ft. long, and 25 ft. wide, still quite perfect, in spite of the traffic of 17 centuries. There are also remains of a castle built by the Romans; and among the other most noteworthy monuments of antiquity are an old half-Roman, half-Moorish palace, the Casa de los Corvos, constructed out of a temple dedicated to Diana, several aqueducts, an ancient theater, and a circus. Merida was built 23 years B.C., and flourished in great splendor, until, in 1229, it was taken from the Moors, after which it began to decline, Pop. 5,500.

MERIDEN, township and village in Connecticut, 18 m. n.e. of New Haven, containing the state reform school and several manufactories. Pop. '70, 10,495.

MERIDEN (*ante*), incorporated as a town in Conn. in 1806, as a city in 1867; pleasantly situated on elevated land, 94 m. n.e. of New York, and 18 m. s.w. of Hartford; pop. '80, 18,340. It has 3 post-offices, each the center of a considerable trade, called respectively Meriden, West Meriden, and South Meriden. The New York, New Haven and Hartford railroad passes through it. Meriden contains the city hall and 2 national banks. In West Meriden, the principal place, several daily and weekly newspapers are published, and it has 1 national bank. The aggregate capital of the banks in both villages is $1,000,000. They have manufactories of electro-plated silver-ware, tin-ware, cutlery, steel, cement pipe, bronzes, gas-fixtures, machinery, malleable iron, brass castings, fire-arms, and woolen goods, employing a capital of $5,000,000, with an annual product of about $15,000,000. The annual product of the britannia works, an extensive establishment, is estimated at $2,500,000, occupying several factories, and employing nearly 1000 men. The township contains 12 churches, 1 fire insurance company, 1 savings bank, a well-organized fire department, water-works, and is lighted with gas. It is one of the most enterprising and prosperous manufacturing centers in New England.

MERIDIAN (Lat. *meridies*, midday), the name given to the great circle of the celestial sphere which passes through both poles of the heavens, and also through the zenith and nadir of any place on the earth's surface. Every place on the earth's surface has consequently its own meridian. The meridian is divided by the polar axis into two equal portions, which stretch from pole to pole, one on each side of the earth. It is midday at any place on the earth's surface, when the center of the sun comes upon the meridian of that place; at the same instant it is midday at all places under the same half of that meridian, and midnight at all places under the opposite half. All places under the same meridian have therefore the same longitude (see LATITUDE AND LONGITUDE). Stars attain their greatest altitude when they come upon the meridian; the same thing is true approximately of the sun and planets; and, as at this point the effect of refraction upon these bodies is at a minimum, and their apparent motion is also more uniform, astronomers prefer to make their observations when the body is on the meridian. The instruments used for this purpose are called *meridian circles*. See CIRCLE, MURAL.

MERIDIAN, a village in e. Mississippi, at the junction, in Lauderdale co., of the Vicksburg and Meridian, and the Alabama Great Southern, on the Mobile and Ohio railroad; pop. about 4,500. It is 135 m. n.w. of Mobile, and 96 m. e. of Jackson. It contains a court-house, 5 schools, 8 churches, 5 newspapers, and 2 female colleges. Its leading industries are represented by the manufacture of cotton goods and yarn, furniture, sashes, doors, and blinds, and plows; other manufactories are foundries, machine shops, steam corn mills, and soda-water factories. It has an excellent trade, due chiefly to its central position in the midst of the lumber region, and is rapidly increasing in wealth and population. It was at this point that the troops of gen. Sherman, on Feb. 16, 1864, accomplished "the most complete destruction of railways ever beheld," according to his own official report.

MERIDIAN MEASUREMENT. The determination of the form and size of the earth from the measurement of an arc of a meridian has been a favorite problem with mathematicians from the earliest times, but up to the middle of last century their operations were not carried on with exactness sufficient to render their conclusions of much value. Since that time, however, geodesy has so rapidly progressed, owing to the invention of more accurate instruments and the discovery of new methods, that the measurement of the meridian can now be performed with the utmost accuracy imaginable. The *modus operandi* is as follows: Two stations, having nearly the same longitude, are chosen; their latitude and longitude are accurately determined (the error of a second in latitude introduces a considerable error into the result), and the direction of the meridian to be measured ascertained; then a base line is measured with the greatest accuracy, as an error here generally becomes increased at every subsequent step; and then, by the method known as triangulation (q.v.), the length of the arc of the meridian

contained between the parallels of latitude of the two stations is ascertained. As the previously found latitudes of its two extremities give the number of degrees it contains, the average length of a degree of this arc can be at once determined; and also—on the supposition that the length of a degree is uniform—the length of the whole meridional circumference of the earth. This operation of meridian measurement has been performed at different times on a great many arcs lying between 68° n. lat. and 38° s. lat., and the results show a steady though irregular increase in the length of the degree of latitude as the latitude increases. On the supposition that this law of increase holds good to the poles, the length of every tenth degree of latitude in English feet is as in the following table:

Degree of Latitude.	Length of Degree in English Feet.	Degree of Latitude.	Length of Degree in English Feet.
0°	362,732	50°	364,862
10°	362,843	60°	365,454
20°	363,158	70°	365,937
30°	363,641	80°	366,252
40°	364,233	90°	366,361

This result shows that the earth is not spherical, as in that case the length of all degrees of latitude would be alike, but of a more or less spheroidal form—that is having its curvature becoming less and less as we go from the extremity of its greater or equatorial diameter to the lesser or polar axis. See EARTH. It was by the measurement of a meridional arc that, in 1792–99, the length of a quadrant of the earth's circumference was determined, in order to form the basis of the French metrical system (see MÈTRE).

MERIMÉE, PROSPER, novelist, historian, and archæologist, was born at Paris, Sept. 28, 1803. His father, Jean François Leonore, was a painter of distinction, and secretary to the école des Beaux Arts. The son entered the college of Charlemagne, kept terms as a law-student, and became early acquainted with English and Spanish literature. The influence of Shakespeare, Calderon, and Goethe was then making itself felt in France, and the romantic school, headed by Victor Hugo, was contending for the possession of the stage against the classic traditions of Racine. Merimée, a devotee of the new sect, published under a double disguise his first work, *Le Théâtre de Clara Gazul*, a collection of studies for the stage, professing to be translated from the Spanish by a certain Joseph l'Estrange. This work raised great expectations, which were never realized. Merimée did not become a dramatist, and one of these pieces failed when represented in 1850. His next publication, also pseudonymous, *La Guzla, by Hyacinthe Maglanovitch*, was an effort to embody the spirit of the popular lays of Illyria and Montenegro. It was written to meet the then prevailing rage for Slavonic-poetry, and the materials were taken at second hand. It was, however, admired in Germany, and received the approval of Goethe. Merimée now became a regular contributor to the *Revue de Paris* and the *Revue des Deux Mondes;* and after one or two more anonymous efforts signed his name to *Tamango*. After the revolution of July he entered public life, and before long was made inspector of historical monuments, and in that capacity visited many parts of France, publishing the results of his researches in a series of reports. During all this time he continued to write for his favorite reviews a series of romantic tales, in which terrible, almost repulsive, subjects are handled with wonderful realistic power, and in a style singularly clear, condensed, and vigorous. This series, in which the *Etruscan Vase* and the *Capture of the Redoubt* are especially noteworthy, culminated in *Colomba* (1841), written by him when fresh from Corsica and its tales of vengeance. After this, his greatest and (with the exception of *Arsène Guillot*, and *Carmen*) his last romance, Merimée, applied himself to historical researches. The *Conspiracy of Catiline* and the *Social War*, studies of Roman history, preliminary to a life of Cæsar, on which he is said to have been occupied many years, appeared in 1844. In this year he was elected to the chair in the academy vacated by the death of C. Nodier. His *History of Dom Pedro the Cruel* (1848), dedicated to the countess of Montijo, the mother of the empress Eugénie, has been translated into English (1850), and reviewed in the *Edinburgh*. After the fall of the Orleans dynasty he was placed on the commission to draw up an inventory of the art treasures left by them in France. In 1854 he published his *False Demetrii*, an episode of early Russian history, the preface to which was written in prison, where he was sent for criticising, in the *Revue des Deux Mondes* (1852), the sentence passed on his old acquaintance, M. Libri (q.v.), a sentence which he tried to get reversed in the senate June 11, 1861. Merimée has also translated from Pushkin and Nicolas Gogol. Among his latest writings may be mentioned an introduction to Marino Vretro's *Poetry of Modern Greece* (1855), two brief articles in the *Revue des Deux Mondes* (1864); and *Lettres à une Inconnue* (1873; Eng. trans. 1874). Merimée was made a senator in 1853; president of the commission for reorganizing the bibliothèque Impériale in 1858; commander of the legion of honor, April 12, 1860. He was also one of the ten *membres libres* of the académie des Inscriptions. He died Oct., 1870.

MERI'NO, an important breed of sheep, originally Spanish, but now widely diffused throughout Europe, and constituting a great part of the wealth of Australia. The Merino has large limbs, and the male has large spiral horns, which do not rise above the head; the skin of the neck is loose and pendulous; the cheeks and forehead bear wool; the fleece is fine, long, soft, and twisted in silky spiral ringlets, abounding in oil, which attracts dust, so that it has generally a dingy appearance. The fleece is sometimes black, and black spots are apt to appear even in the most carefully bred flocks. The Merino sheep fattens slowly, and owes its value altogether to the excellence of its wool. It has not been found profitable in Britain, where the production of mutton is a great part of the object of the sheep-farmer.

MERINO. See WOOLEN MANUFACTURE.

MERIONES: MERIONIDIDÆ, a genus of rodents of the family dipodidæ, allied to the common jerboa (*dipus Ægypticus* of Africa and south-western Asia. The best-known species is the *meriones hudsonius*, or jumping mouse of North America (*jerboa Hudsonicus* of Baird, Labrador, southward and westward to the Pacific). It is about 3 in. long to the tail, which is from 5 to 6 inches. Its color above is light brown, lined with black; belly white, sides yellowish gray, contrasting finely with the back and belly. It takes very long and rapid leaps, moving probably with greater rapidity when pursued than any other mammal of its size See RODENTIA.

MERIONETH, a co. of Wales, is bounded on the w. by Cardigan bay, and on the n. by the counties of Caernarvon and Denbigh. Area, 385,291 acres; pop. '71, 46,598. The coast immediately south of the town of Harlech rises into cliffs, is skirted by sands, and fringed by three dangerous sandbanks at some distance out to sea. Merioneth is the most mountainous co. in Wales, although its peaks do not rise to the height of some of those in Caernarvonshire. The chain comprising the highest peaks runs from n.w. to s.e., and its summits are Arran Mowddy (2,955 ft.) and Cader Idris (q.v.). The county is watered by the Dee, which flows n.e., and by the Mawddach and the Dovey, which reach the sea after a s.w. course. The soil of Merioneth is generally poor, and large tracts are unfit for profitable cultivation. Of the total acreage only 151,291 acres were under crop in 1876; and of this portion 113,698 acres were in permanent pasture. There were 376,986 sheep in the county. Slate and limestone are largely quarried; a little lead and copper is mined; and of late gold has been found in Merioneth. In 1866 there were obtained at castle Carndochan 529 oz. of gold, and at Vigra and Clogau 214 ounces. Woolens and flannels are manufactured. Chief town, Dolgelley (q.v.).

MERIVALE, JOHN HERMAN, an English scholar and translator, was b. at Exeter in 1779, studied at St. John's college, Cambridge, and was called to the bar in 1805. He contributed largely to Bland's *Collections from the Greek Anthology*, published in 1813, and brought out a second edition himself in 1833. From 1831 to his death in 1844 he held the office of commissioner of bankruptcy. Among his other literary performances may be mentioned *Poems Original and Translated* (1841), and *Minor Poems of Schiller* (1844). MERIVALE, the rev. CHARLES, son of the preceding, was b. in 1809, studied at St. John's college, Cambridge, where he took his degree in 1830, and was successively scholar, fellow, and tutor. He has acquired a great reputation as an author by his *Fall of the Roman Republic* (1853), *History of the Romans under the Empire*, 8 vols. (1859–65), and Boyle lectures (1864–65), etc. Merivale was installed dean of Ely in 1869. Another son, HERMAN, born in 1805, was appointed prof. of political economy at Oxford in 1837, and permanent under-secretary of state for India in 1859. In the same year he was made C.B. He also wrote on colonization. He died on Feb. 8, 1874.

MERIWETHER, a co. in w. central Georgia; bounded w. by the Flint river, and is drained by many tributary creeks; 550 sq.m.; pop. '80, 17,651—9,836 colored. The surface is hilly and varied. The staples are cotton, Indian corn, and grass; of cotton there are produced not far from 10,000 bales yearly. There are many mineral springs in the co., of which the largest is at Warm springs on Pine rock, 40 m. n.e. of Columbus; it discharges 1400 gallons a minute; the water has a temperature of 90° Fahr., and contains magnesia, carbonic acid, etc. Chief town, Greenville.

MERIWETHER, DAVID, 1755–1825; b. Va.; a soldier at the siege of Savannah 1778–79, in which he was taken prisoner by the British. In 1785 he removed to Georgia and filled several offices in the gift of the state, representing his district in the legislature, and was member of congress 1802–07 as representative from Georgia. He was an earnest supporter of president Jefferson, whose policy he cordially indorsed, and was appointed by him Indian commissioner to adjust the claims of the tribe of Creek Indians in Florida. In 1817 he was chosen presidential elector, and the same year was on the commission with gen. Andrew Jackson and gov. McMinn of Tennessee, to treat with the Cherokee Indians of Georgia, which was concluded July 8, 1817, by which an extensive tract of land, w. of the Appalachee river, was added to the territory of the United States, opening the cotton-growing region of Georgia, now thickly populated, intersected by railroads, and furnishing granite, iron ore, and gold to the mineral wealth of the country. In 1821 he was again chosen presidential elector.

MERLE. See BLACKBIRD, *ante*.

MERLE D'AUBIGNE, JEAN HENRI, a popular ecclesiastical historian, was b. at **Eaux**-Vives, near Geneva in Switzerland, Aug. 16, 1794, studied there and at Berlin—under Neander—and subsequently became pastor of the French Protestant church in Hamburg. Thence, after a residence of five years, he proceeded to Brussels, became chaplain of king William, who, after the revolution of 1830, invited him to Holland, as tutor to the prince of Orange. Merle, however, declined the offer, and returning to Geneva took part in the institution of a new college for the propagation of orthodox theology, in which he was appointed professor of church history. With the exception of some visits to England and Scotland, where he had numerous readers and admirers, he remained constantly at Geneva. The work which has given him so wide-spread a reputation is his *Histoire de la Réformation au Seizième Siècle* (1835 et seq.). It is written with the utmost vivacity, and is sometimes eloquent. Its popularity has been immense. Among Merle d'Aubigné's other writings are—*Le Luthéranisme et la Réforme* (Par. 1844); *Germany, England, and Scotland* (1848); *Le Protecteur, ou la République d'Angleterre aux Jours de Cromwell* (1848); *Trois Siècles de Lutte en Ecosse* (1850); *Caractère du Réformateur et de la Réformation de Génève*, and *Histoire de la Réformation en Europe au Temps de Calvin* (1862–77). He died at Geneva Oct. 20, 1872.

MER'LIN, *Falco æsalon* or *Hypotriorchis æsalon*, the smallest of the British *falconidæ*, scarcely exceeding a blackbird in size, but very bold and powerful, and possessing all the characters of the true falcons, with the distinction of large hexagonal scales on the front of the tarsi. It is of a bluish ash color above; reddish yellow on the breast and belly, with longitudinal dark spots, the throat of the adult male white. The wings reach to two-thirds of the length of the tail. It builds its nest on the ground, and is fond of localities where large stones are plentiful, on which it is often to be seen perched, and is therefore often called the *stone falcon*. It is common in most parts of Europe, is found in Asia and North America, and extends southwards in Africa, even to the cape of Good Hope. It was of great repute in the days of falconry, being very easily trained, and flying readily at its quarry. It was therefore often used for taking partridges and wood-pigeons. It is a very lively bird, and often utters a harsh scream. It usually flies low and very rapidly, threading its way, if necessary, through branches and leaves, but it will also follow its prey in mounting upwards to a great height.

MERLIN, the name of an ancient Welsh prophet and enchanter, who is believed to have flourished during the decline of the native British power in its contest with the Saxon invaders. Both the Cambrian and the Strathclyde Britons boasted of a Merlin who was, in all probability, the same personage decked out in different legendary guise.—The Cambrian Merlin called *Merlin Emyrs* or *Ambrosius*, is said by Geoffrey of Monmouth, in his *Historia Brittonum*, to have lived in the 5th c., to have sprung from the intercourse of a demon with a Welsh princess, and to have displayed the possession of miraculous powers from infancy. He is alleged to have been the adviser of King Vortigern, and subsequently of Ambrosius, Uterpendragon, and the great King Arthur. He is often alluded to by our older poets, especially Spenser, in his *Fairy Queen*, and also figures in Tennyson's *Idylls of the King*. He has been made the subject of a metrical romance, of which there is a manuscript copy in the advocates' library in Edinburgh. (For an analysis of this romance, see Ellis's *Specimens of Early English Metrical Romances.*) A collection of prophecies attributed to him appeared in French (Paris, 1498), in English (Lond. 1529 and 1533), and in Latin (Venice, 1554); and their existence is traceable at least as far back as the time of the poet Lawrence (*circa* 1360).—The Strathclyde, or—if we may be allowed an expression which anticipates history—the *Scottish* Merlin, called Merlin the Wyllt, or Merlin Caledonius, is placed in the 6th c., and appears as a contemporary of St. Kentigern, bishop of Glasgow. His grave is still shown at Drummelzier on the Tweed, where, in attempting to escape across the river from a band of hostile rustics, he was impaled on a hidden stake. A metrical life of him, extending to more than 1500 lines, professedly based on Armoric materials, and incorrectly ascribed to Geoffrey of Monmouth, was published by the Roxburghe club in 1830. His prophecies—published at Edinburgh in 1615—contain those ascribed to the Welsh Merlin.

MER'LON, in fortification, is the portion of the parapet between two embrasures. Its length is usually from 15 to 18 feet.

MERLU'CIUS, a genus of fishes belonging to the cod family. See HAKE, *ante*. The American hake (*M. albidus* of DeKay), called whiting in New England, and also silver hake, is from one to two feet long, the upper part of the body rusty brown, with golden hues, by reflection, while alive. It is silvery white on the belly, and the iris has a silvery appearance. Lower jaw longer than upper; teeth long and sharp. It is abundant in British America, and as far south as New Jersey. It is very voracious, and devours many of the smaller fishes. Another American hake belongs to the genus *phycis* (q.v.)

MERMAID (i.e., sea-maid), an imaginary inhabitant of the sea. The upper parts of mermaids are represented as resembling those of a human being, generally of a female—although the *merman* is also sometimes heard of—whilst the body terminates in a tail like that of a fish. There is an evident affinity between the stories concerning mermaids and those concerning the sirens and tritons, perhaps also the nereids, of the ancients. The probability is that these stories have originated in the appearance of seals, wal-

ruses, and perhaps still more of the herbivorous cetacea, in regions where they are rare, or to persons unaccustomed to see them. "Large allowances must be made for the workings of an excited imagination, in situations of solitude and apprehension, on the unexpected appearance of an extraordinary and unknown object." Many of the stories concerning mermaids belong to the northern parts of the world, where the herbivorous cetacea are of rare occurrence, and perhaps some of the solitary seals have often given occasion to them. But the herbivorous cetaceans do occasionally wander into the British and probably even into more northern seas. Sir James Emerson Tennent says concerning the dugong (q.v.): "The rude approach to the human outline, observed in the shape of the head of this creature, and the attitude of the mother while suckling her young, holding it to her breast with one flipper, while swimming with the other, holding the heads of both above water; and when disturbed, suddenly diving and displaying her fish-like tail—these, together with her habitual demonstrations of strong maternal affection, probably gave rise to the fable of the mermaid; and thus that earliest invention of mythical physiology may be traced to the Arab seamen and the Greeks, who had watched the movements of the dugong in the waters of Manaar." It is right, however, that we should bear in mind the possibility of the existence in the ocean of cetaceans not yet known to naturalists.—The mermaid is a not unfrequent heraldic bearing. In the heraldry of France, she is called a siren, and in Germany she is occasionally furnished with two fishy tails.

MERMAID'S GLOVE, *Halichondria palmata*, a sponge pretty common in the British seas, and the largest of British sponges. It grows in deep water, and is sometimes two feet in height. It receives its name from the somewhat finger-like arrangement of its branches. It is not slimy, and has a very porous surface; rough, with myriads of minute fragile spiculæ. Its color is yellowish.

MER'ŌDACH, or BEL MER'ODACH, the name of a Babylonian god, as is evident from its occurring in Jer. i. 2 in connection with idols. It is supposed to be the name of a planet, either Mars or Jupiter. It is supposed to be derived from the Persian and the Indo-Germanic *mord* or *mort*, which means death, and the affix *och* found in many Assyrian names, as Nisroch, etc. Merodach was identical with the famous Babylonian Bel or Belus, the word being first probably a mere epithet of the god, and by degrees superseding the proper name. But the names were sometimes distinguished. The golden image in the temple of Babylon seems to have been worshiped as Bel rather than Merodach, while other idols may have represented him as Merodach. The temple described by Herodotus as the temple of Belus is, in the inscriptions, the temple of Merodach. But we do not know what the distinction was between the two names. It is not clear what the aspect of the god was when worshiped. Bel Merodach is represented as the "old man of the gods," "the judge," and Nebuchadnezzar calls him the great lord, "the most ancient," and Neriglissur the "first-born of the gods," "the layer up of treasures." He is regarded as the source of all power, and thus concentrates in his own person the greater part of that homage which had previously been divided among the various gods of the Pantheon. The Babylonian kings were often named after him, as Merodach Baladan, Evil Merodach, etc.

MÉRODE, FRANÇOIS XAVIER MARIE FRÉDÉRIC GHISLAIN DE, 1820–74; b. Brussels; a grand-nephew of Lafayette. His father, count Félix de Mérode, had been offered and refused the Roman Catholic candidature for the throne of Belgium. His son at first entered the army and took part in the Algerian campaign. In 1848 he began the study of theology at Rome, where he was ordained to the priesthood in 1850. Pius IX. at once made him his chamberlain, and canon of St. Peter's. In 1860 he was appointed temporary minister of arms, and recruited, chiefly from foreigners, a pontifical army. In 1865 he went out of office in consequence of a dispute with cardinal Antonelli. The next year he was made archbishop of Melitene, and papal almoner. In 1869, at the instance as is supposed of his brother, count Montalembert, he resisted the declaration of the doctrine of papal infallibility; but he acquiesced in the final enunciation of it by the ecumenical council. He gave liberally for the foundation of charitable and educational institutions, and the improvement of public grounds and streets in Rome.

ME'RŎË. See ETHIOPIA.

MEROM, or HÛLEH, LAKE, generally regarded as the waters of Merom, where the assembled forces of the confederate kings of Canaan were defeated by Joshua, is at the n. end of the Jordan valley, where it forms the central part of a low plain, 16 m. long and 7 wide, and surrounded with hills of various heights. The lake itself is triangular at the base, of which towards the north the upper Jordan enters and from its apex flows out again towards the s. on its steep descent to the sea of Galilee. The falling rains and melting snows periodically increase its size, but its average length is about 4½ m. and its width 3½. It is surrounded with marshy ground covered with a dense jungle of canes, the home of wild swine and ill-looking buffaloes that are often seen wallowing in the mud or standing almost immersed in the water. The lake is shallow and is covered for acres with yellow and white water lilies and with the true Egyptian papyrus. Hûleh is one of its ancient names, which Josephus employs for the region under the form *Ulatha*, while he calls the lake itself *Semechonitis*. The district as well as the lake is still called

Hûleh, is very fertile, but inhabited only by a few Arabs who dwell in tents. There is not a village or a house in any part of it.

MEROP'IDÆ. See BEE-EATER.

MEROPIS. See Cos, *ante.*

MEROSTOM'ATA (Gr. *meron,* thigh; *stoma,* mouth), an order of crustaceans comprising two sub-orders, eurypterida (Gr. *eurus,* broad; *pteron,* wing) and xiphosura (Gr. *xiphos,* sword; *oura,* tail), the latter including the only living representative, the king-crab, or horse-shoe crab. The first of these sub-orders is extinct, and their fossils are exclusively paleozoic, all the members being confined to the Silurian, Devonian, and carboniferous formations. The sub-order eurypterida is described by Henry Woodward as composed of "crustaceans with numerous free thoracico-abdominal segments, the first and second of which bear one or more broad lamellar appendages upon their ventral surface, the remaining segments being devoid of appendages; anterior rings united into a carapace bearing a pair of larval eyes near the center, and a pair of large, marginal, or sub-central eyes; the mouth furnished with a broad post-oral plate or *metastoma,* and five pairs of movable appendages, the posterior of which form great swimming-feet; the telson, or terminal segment, extremely variable in form; the integument characteristically sculptured." Some of the members of this sub-order were of gigantic dimensions, as *pterygotus anglicus,* measuring 6 ft. or more in length. The berry-like bodies found in the old red sandstone of Scotland, and described under the name of *parka decipiens,* are regarded as the eggs of large crustaceans of the eurypterid group. The second sub-order, xiphosura, are characterized by Woodward as follows: "Crustacea having the anterior segments welded together to form a broad, convex buckler, upon the dorsal surface of which are placed the compound eyes and ocelli; the former subcentrally, the latter in the center in front. The mouth is furnished with a small labrum, a rudimentary *metastoma,* and six pairs of appendages. Posterior segments of the body are more or less free, and bearing upon their ventral surfaces a series of broad lamellar appendages; the telson, or terminal segment, ensiform." The only living members of this sub-order are the *limuli,* commonly known as king-crabs, horse-shoe crabs. They inhabit the Indian and Japanese seas, the Antilles, and the coasts of North America. The xiphosura commenced their existence in the upper Silurian formation, where they are represented by the *neolimulus falcatus* of Henry Woodward. In this genus the head-shield has a resemblance to that of the king crab, and there are traces of a divisional line crossing the head, and apparently corresponding with the facial suture of the trilobites (q.v.). Compound eyes and ocelli seem to be present, and there are six free thoracic, and probably three free abdominal segments, of which only two have been preserved. No members of the sub-order have been found in the Devonian formation, but several types occur in the carboniferous, the most important member being *pestwichia rotundifolia* of the coal measures of Europe, and the genus *euproöps* of the North American coal measures, very similar to each other, the latter, however, having eyes situated on the anterior edge of the cephalic buckler. Limuloid crustaceans are also found in the permian and triassic formations, as well as in the upper Jurassic, the cretaceous, and tertiary. See INVERTEBRATA.

MEROVIN'GIANS, the first dynasty of Frankish kings in Gaul. The name is derived from Merwig or Merovaens, who ruled about the middle of the 5th c., having united a few tribes under his sway. His grandson, Chlodwig or Clovis (q.v.), greatly extended his dominions, and on his death divided his kingdom among his four sons, one of whom, Chlotar or Clotaire I., reunited them under his own sway in 558. On his death, in 561, the kingdom was again divided into four parts—Aquitaine, Burgundy, Neustria, and Austrasia. His grandson, Clotaire II., again united them in 613; but after his death, in 628, two kingdoms, Neustria and Austrasia, were formed, in both of which the Merovingian kings retained a merely nominal power, the real power having passed into the hands of the mayors of the palace. The dynasty of the Merovingians terminated with the deposition of Childeric IV., in 752, and gave place to that of the Carlovingians (q.v.), sprung from the Austrasian mayor of the palace. The chief authority for the earlier parts of the history of the Merovingians is Gregory of Tours. See also Thierry's *Recits Mérovingiens* (Par. 1839), and Pertz, *Geschichte der Merovingi. Hausmeier* (Leip. 1819).

MERRICK, a co. in e. central Nebraska; drained by Prairie creek, Loup fork, and Platte river, the latter forming its s.e. boundary; 650 sq.m.; pop., '80, 5341, showing nearly a tenfold increase from that of '70, 557. The Union Pacific railroad traverses the s.e. part of the county. The surface is rolling prairie, well wooded, and very fertile. Wheat and the other cereals are raised in large quantities. Chief town, Central City.

MERRICK, JAMES LYMAN, 1813–66; b. Monson, Mass.; graduated at Amherst college in 1830, and at the theological seminary at Columbia, S. C., in 1833; ordained as a missionary to Persia in 1834; embarked for Constantinople in 1834, and arrived in 1835 at Tabriz, Persia. Having traveled and labored among the Mohammedans for two years, he joined the Nestorian mission at Oroomiah. Returning to America in 1845 he was installed pastor of the Congregational church at Amherst, where he remained until his death. He was a faithful missionary and pastor. He had not only a thorough knowledge of Persian, but was well versed in Arabic, Hebrew, Turkish, Greek, Latin, and

French. He was much interested in the Persian language and literature, and bequeathed his property for the forming of four Persian scholarships in Amherst college and Columbia seminary. He published the *Pilgrim's Harp*, a volume of poems; *The Life and Religion of Mohammed*, translated from the Persian; *Keith's Evidences of Prophecy*, translated into Persian; *A Full Work on Astronomy*, left in MS. and translated into Persian; *A Friendly Treatise on the Christian Religion; A Treatise on the Orthography and Grammar of the English Language.*

MERRILL, Stephen M., D.D., b. Ohio, 1825; became a traveling preacher in the Ohio conference, 1846; was chosen editor of the *Western Christian Advocate*, 1868; and elected one of the bishops of the Methodist Episcopal church, 1872. His residence is at Chicago.

MERRILL, William E., b. Wis., 1837; appointed brevet 2d lieut. of engineers in 1859, having graduated first in his class at the West Point military academy; promoted to 1st lieut. in 1861, capt. in 1863, and maj. in 1867. His father, capt. M. E. Merrill, was killed in the Mexican war, where he served in the 5th U.S. infantry, under gen. Winfield Scott, falling at the head of his command in the attack on the fortress of Molino del Rey, which guarded the field of Chapultepec, Sept. 8, 1847. During the war of the rebellion William E. was appointed assistant engineer in the armies of Virginia and Ohio, and afterward chief engineer of the army of the Cumberland under gen. Rosecrans. He was present at the battles of Chickamauga, Sept. 19, 20, 1863, when the union forces under gen. Rosecrans suffered defeat by gen. Bragg, and at Missionary Ridge on Nov. 24, 1863, when the same army under gen. Grant defeated gen. Bragg. Subsequently, he went with the federal force under gen. Sherman to reinforce gen. Burnside, intrenched at Knoxville; the movement resulting in the raising of the siege and the defeat of Longstreet. In 1864 he raised a regiment of volunteer veteran engineers, and being commissioned col., he served with them in the departments of Tennessee, Alabama, and Georgia, in raising fortifications at unprotected points. At the close of the war he was given a commission on the staff of the lieut.gen. of the army, and engaged in improving the communications of the west, river navigation, surveys, and building roads and bridges. In 1870 he published *Iron Truss Bridges for Railroads.*

MERRIMAC, a river of New England, U.S., rising in New Hampshire, and falling into the Atlantic ocean at Newburyport, after a course of about 120 miles. It receives several small tributaries, and has numerous falls, affording immense water-power, on the principal of which are the manufacturing towns of Nashua and Manchester, in New Hampshire, and Lowell and Lawrence, in Massachusetts. Navigable 15 m. to Haverhill.

MERRIMACK, a co. in s. New Hampshire, drained by the Merrimac river intersecting it centrally, and furnishing extensive water power; 900 sq.m.; pop., '80, 46,211. It is also drained by the Contoocook, Warner, and Black rivers in the w., and Suncook river, with other branches of the Merrimac, and has numerous lakes on the east. Its surface is rough and hilly. It is well timbered, many forests of maple, pine, and oak growing along the rivers, and on the hill tops. The Winnepesaukee river forms part of its n. boundary, flowing s.w. from Great bay. It contains Kearsage mountain, 2,943 ft. above the level of the sea, 10 m. w. of lake Sunapee, which for 9 m. forms part of its n.w. boundary, the Little Sunapee lake lying a little to the north. It is traversed by the Concord railroad in the e., the Concord and Claremont railroad, and Contoocook branch, the Northern (N.H.), and the Suncook Valley railroad. Its soil is fertile, producing large quantities of fruit, all kinds of grain, wool, Irish potatoes, and dairy products. Much live stock is raised. It has quarries of the finest granite which is extensively exported. Among its manufactures are cotton goods, woolen goods, silver ware, wooden ware, iron castings, leather, carriages, lumber, and paper, machinery, bricks, furniture, leather belting, organs, etc. In the n.e. section is Shaker village, containing a Shaker church, the inhabitants being engaged in the manufacture of hosiery, corn brooms, and washing machines. Seat of justice, Concord.

MERRITT, Timothy, 1775–1845; b. Conn.; entered the ministry of the Methodist Episcopal church in 1796, and for 34 years was pastor successively in Boston, Lynn, Providence, Springfield, New Bedford, etc. While preaching at Malden he edited *Zion's Herald* in Boston, and in 1832–36 was assistant editor of the *Christian Advocate and Journal* in New York. He was a thorough scholar, an able writer, an eloquent preacher, an accomplished debater. He published *The Christian's Manual; The Convert's Guide and Preacher's Assistant; Validity and Sufficiency of Infant Baptism*, and in connection with the Rev. Wilbur Fisk, *Lectures and Discourses on Universal Salvation;* also many controversial pamphlets and sermons.

MERRITT, Wesley, b. New York, 1836; after graduating from the U. S. military academy at West Point, class of 1860, was commissioned brevet 2d lieut. of dragoons and in 1862 capt. 2d U. S. cavalry. He was on the staff of the cavalry gen. Stoneman when he made the raid on Richmond in April, 1863, and 2 months after was promoted to volunteer brig.gen. For bravery at Gettysburg, where he commanded the reserve cavalry brigade, he was brevetted maj. July, 1863. From 1863 to 1864 he commanded a cavalry division in central Virginia. He commanded a cavalry brigade under gen. Sheridan in

the Richmond campaign of 1864 and did good work at the battle of Yellow Tavern, for which he was brevetted lieut.col. May 11, 1864, and col. for the battle of Hawes's Shop, May 28, 1864. He was present at the battles of Opequan, Cedar Creek, and Fisher's Hill; and commanded a division under gen. Sheridan through the Shenandoah campaign, for which service he was brevetted maj.gen. of volunteers. He distinguished himself at Five Forks, Sailor's Creek, and at the final surrender, and was promoted to maj.gen., his commission dating from Five Forks. On July 28, 1866, he was commissioned lieut.col. of the 9th U. S. cavalry, having some months previous been mustered out of the volunteer service.

MERRY, ROBERT, 1755–98; b. in London; took a degree at Christ's college, Cambridge, and began the study of law, but was never called to the bar. Having purchased a commission in the army he was for some years a lieut. in the horse-guards. After leaving the service, Merry traveled extensively throughout Europe; and in Florence was admitted a member of the noted Della Cruscan academy. After his return to England he published many poems under the signature of Della Crusca. His ambition was to form a new school and his style is similar to that of Mrs. Piozzi and Bertie Greathead. His audacity was much greater than his genius; and the whole school of his imitators was satirized by sir Wm. Gifford of the *Quarterly Review* in his *Mæviad* and *Baviad*. In 1791 Merry married an actress, Miss Brunton, and 5 years later emigrated to the United States, and died very suddenly in Baltimore. His principal writings were: *Lorenzo; Fenelon;* and *Ambitious Vengeance,*—all dramas; and he left many fugitive poems.

MERSEBURG, a t. of Prussian Saxony, capital of a circle of the same name, on the Saale, 60 m. s.s.e. of Magdeburg. The cathedral, a noble specimen of mediæval architecture, is surmounted by four beautiful towers, and has one of the largest organs (with 4,000 pipes) in Germany. It contains the monument of Rudolf of Swabia, an aspirant to the imperial title, who was here defeated and slain (1080) by Henry IV.; a bronze plate in low relief, probably the oldest mediæval effigy extant. The castle—a picturesque edifice, mostly of the 15th c.—was once a residence of the Saxon princes. Cotton and woolen goods, paper, and tobacco are here manufactured, and bleaching and brewing are carried on. The beer of Merseburg is famous. Pop. '75, 13,678. It was near this town that the emperor Henry the fowler gained his famous victory over the Hungarians in 934.

MERSEY, an important river of England, separates, in its lower course, the counties of Cheshire and Lancashire, and has its origin in the junction of the Thame and Goyt, on the borders of Derbyshire, e. of Stockport. It flows in a w.s.w. direction, and is joined on the right by the Irwell from Manchester, at which point it becomes navigable for large vessels. Besides the Irwell, the chief affluents are the Bollin and the Weaver from Cheshire. At its junction with the Weaver the Mersey expands into a wide estuary, which forms the Liverpool channel. The estuary is about 16 m. long, and from 1 to 3 m. broad; opposite Liverpool it is a mile and a quarter in width, with a considerable depth at low water. It is much obstructed by sandbanks; but the excellent system of pilotage in practice here renders the navigation comparatively secure. Congers, shrimps, flounders, and sparlings abound in the river and estuary. Entire length with the estuary, nearly 70 miles.

MERTHYR-TYDVIL is a market t. of South Wales, with a pop., in '71, of 51,949 within the parish, which has a local board of health. The parliamentary borough embraces Aberdare and two other outlying districts; pop. 97,020. It is on the northern border of the county of Glamorgan, abutting upon the county of Brecknock, and surrounded by lofty hills. It is built upon the river Taff, 500 ft. above sea-level, 24 m. from its mouth and port at Cardiff; and it includes the junctions of the greater and lesser Taff, the Morlais, and the Dowlais, streams which there unite to constitute the main river. Merthyr-Tydvil is the seat of the iron trade of Glamorgan, as represented by the great works of Dowlais, Cyfarthfa, and Plymouth, and in a less degree by that of Penydarren. It also contains large collieries, and is celebrated, with Aberdare, for the excellence of its steam coal. The annual make of finished iron in this place, chiefly in the shape of rails, merchant-bars, girders, and ship-plates, may be stated roughly at 200,000 tons. The exports of coal are considerable, and are increasing, but the chief consumption is within the works. The population are all directly dependent upon the works, there being no other trade or manufacture. Railways branch from Merthyr-Tydvil to Brecon, to Swansea, to Cardiff and Penarth, and to Newport and Hereford. The borough was created by the first reform act, and now returns two members. Its chief town-officer is the headborough of the lordship, called the "high constable," and its government is vested in a local board. Dowlais contains some fine public buildings, but Merthyr-Tydvil is deficient in this respect. Though a busy, it is not a striking place, having risen very rapidly with the local trade, and having attained nearly its present dimensions before it was under any but the ordinary parochial government. There are, however, symptoms of improvement. It is well supplied with water, and the infantile mortality, long extraordinary, is now reduced. The people, chiefly Welsh, are industrious, and, on the whole, very orderly. There are 17 established churches, and 113 dissenting chapels in the borough.

MERTON, WALTER DE, d. 1277; b. England; educated in the convent at Merton, in Surrey, and ordained to the priesthood. Henry III. raised him to the lord chancellorship in 1258, from which office he was deposed by the barons under Simon de Montfort in 1259. He returned to that office in 1261, was removed in 1263, and reappointed in 1272. He resigned two years later, when he was appointed to the see of Rochester. He founded at Basingstoke a hospital for superannuated clergymen and travelers in distress; but he is best known by his foundation of Merton college, Oxford, which was completed in 1274. This was a purely secular and literary institution, and became the model of the subsequent Oxford foundations.

MERTON COLLEGE, OXFORD. The house of the scholars of Merton, commonly called M.C., the model of all the secular colleges, was first founded in Maldon in Surrey by Walter de Merton, bishop of Rochester, and lord high chancellor, in 1264, for the maintenance of 20 scholars in the schools of Oxford, and of a warden and three or four ministers of the altar, who were to manage the property. Before 1274 he transferred his warden and ministers to Oxford—thereby not only founding his own college, but contributing in no small degree to fix the university in its present locality. The fellows were to be as many as the means of the house could maintain, and after some changes, this number was fixed by archbishop Laud at 24. They were to be elected first and chiefly from the founder's kin; but this was from an early period evaded, and the commissioners of 1852 speak of "a common belief in the university that the elections to fellowships at Merton were formerly determined by personal interest." In 1380 Dr. Wylliot, chancellor of Exeter, endowed twelve *portionistæ*, or postmasters as they are now called, equivalent to the scholars of other colleges; and in 1604 John Chamber, fellow of Eton, endowed two more—restricted, however, to foundationers from Eton. By the ordinances under 17 and 18 Vict. c. 81, considerable changes were made—six fellowships were suspended, of which two were assigned to increase the postmasterships, etc., and four to the endowment of the Linacre professorship of physiology, of value £800 per annum. The remaining 18 were thrown open, and not to exceed £250 per annum, exclusive of rooms, until the original number of 24 was restored. The number now being completed, they have reached their limiting value of £300. Sixteen postmasterships, and four scholarships (founded by Henry Jackson in 1753), each of the value of £80 a year, are open without restriction, and tenable for 20 terms from election; but the two postmasterships on the foundation of John Chamber are only to be thrown open in default of candidates from Eton being found duly qualified. This college possesses 18 benefices, to some of which, however, certain other patrons present in turn.

MERU, in Hindu mythology, a fabulous mountain in the center of the world, 80,000 leagues high. It is the most sacred of all mythical mountains, the abode of Vishnu, and endowed with all imaginable charms.

MERU'LIDÆ, or TURDIDÆ, a family of birds of the order *Insessores*, sub-order *Dentirostres*, having arched and compressed bills, which are pointed and notched, but not strongly. They are regarded by many naturalists as intermediate between the *Laniadæ* (Shrikes, etc.) and the *Sylviadæ* (Warblers, etc.). The species are very numerous, and are arranged in many genera. They are very widely distributed over the globe, some of them being found in cold and some in warm climates. Some are migratory, a few species are gregarious at all seasons, many are gregarious only in winter. They generally build their nests in trees. They feed chiefly on soft animal and vegetable substances, as berries, insects, and worms. Many of them are birds of very sweet song; some are remarkable for their imitative powers. To this family belong thrushes (among which are reckoned the blackbird, redwing, fieldfare, ring-ouzel, etc.), orioles, mocking-birds, dippers, etc.

MÉRY, JOSEPH, 1798–1866; b. France, educated at a seminary and subsequently studied law, but early developed a passion for atheistical lore, and was expelled from the seminary on that account. While reading law he had an unfortunate affair, ending in a duel, which resulted in his dismissal from the school, but not in dulling his keen sense of honor, for he was soon after one of the principals in a duel in Paris in which he was severely wounded. Subsequently he lived a dissipated life in Italy, and was ultimately obliged to leave the country. In 1821 he attacked the abbé Elicagaray in a pamphlet, and was placed under arrest, but not profiting by this seclusion he soon found himself again in durance for transgressing the laws regulating the press. The following year he went to Constantinople and returned after a short sojourn (not being on good terms with the French ambassador at that port), to edit a newspaper at Marseilles, and in 1824, found himself once more in Paris, associated with Auguste Marseille Barthélemy the satirist, and together they published *La Villéliade*, an attack on the ministry of Villèle. With him he was associated in writing verses dedicated to the Bonaparte family, and satirical verses on other administrations, and published poems, romances, and dramas in rapid succession. In 1828, they published *Napoleon en Égypte*, a lyrical poem, sending presentation copies to each member of the Bonaparte family. Among his most attractive works, some of which have been translated into English, are *Nuits anglaises*, first issued as *Nuits de Londres; Héva; La guerre du Nizam; Les confessions de Marion Delorme; Nuits d'Orient; Un carnaval de Paris;* and *Poésies intimes*, late edition 1864. He published, 1861, *Théâtre de salon*, and wrote the libretto for *Sémiramis* and other operas.

MESAG'NA, a t. of the province of Lecce, in southern Italy, situated amidst scenery of oriental beauty, 27 m. n.w. of Lecce, and surrounded by strong walls. The district around is fruitful, and yields delicious oil, which forms an important article of the trade of Mesagna. Pop. 8,500.

MESCA'LA, a river of Mexico, which takes its rise in the s.e. part of the country, not far from Puebla. Its general course is westerly and southerly; and it is about 400 m. in length, emptying into the Pacific at the port of Zacatula. It is known in the first part of its course as the Atoyac, then as the Rio Pablano, and, where it serves as the boundary line between Guerrero and Michoacan, as the Rio de las Balsas; and near the city Zacatula is known by that name. The current of the stream is exceedingly swift and the river consequently not navigable. It has been thought by the natives that the water contains poisonous mineral ingredients, and to this is ascribed the prevalence of a loathsome skin disease among the Indians living on its banks. Gold is found on its banks and especially near the mouth.

MESEMBRYA'CEÆ, or FICOIDEÆ, a natural order of exogenous plants, both herbaceous and shrubby, but all succulent. As defined by some botanists, it includes the orders *tetragoniaceæ, sesuviaceæ,* etc., of others. Of the more restricted mesembryaceæ about 400 species are known, a few of which are natives of the south of Europe, but none are British; the greater number belong to South Africa and the South Sea islands. The ice plant (q.v.) belongs to this order. The leaves of some species, when burned, yield soda in great abundance. Large quantities of barilla are made from them in the Canary islands, in Spain, and in Egypt. The seeds of some, as *mesembryanthemum crystallinum* (the ice plant) and *M. geniculiflorum,* are ground into flour to make bread. *M. geniculiflorum* is used as a pot-herb in Africa. The fruit of *M. edule* (Hottentot's fig) is eaten in South Africa, and that of *M. æquilaterale* (pig's-faces) in Australia. *M. emarcidum* is called *kou* by the Hottentots, who beat and twist up the whole plant, allow it to ferment, and chew it like tobacco. When newly fermented it is narcotic and intoxicating. Some species of *mesembryanthemum* are now common annuals in flower gardens in Britain

MESENTERY,—MESENTERIC DISEASE. The mesentery derives its name from being connected to the middle portion (Gr. *meson*) of the small intestine (*enteron*). It is a broad fold of peritoneum (the great serous membrane of the abdomen), surrounding the jejunum and the ileum, and attached posteriorly to the vertebral column. Its breadth between the intestinal and vertebral borders is about 4 in.; its attachment to the vertebral column is about 6 in. in length, and its intestinal border extends from the duodenum to the end of the small intestine. It serves to retain the small intestines in their place, while it at the same time allows the necessary amount of movement, and it contains between its layers the mesenteric vessels, the lacteal vessels, and mesenteric glands. These glands are 100 to 150 in number, and are about the size of an almond. They exert an organizing action on the contents of the lacteals, the chyle being more abundant in fibrine and in corpuscles after it has passed through them. Hence it is obvious that disease of these glands must always seriously affect the process of assimilation. The most important affection of these organs is their scrofulous or tubercular degeneration, which gives rise to the disease known as *tabes mesenterica,* a disease most common in childhood, but confined to no period of life. In the great majority of cases it is associated with, and often marked by, other results of the tubercular or scrofulous diathesis, such as pulmonary consumption, tubercular peritonitis, scrofulous disease of the spine, rickets, etc.; but sometimes the mesenteric glands seem almost exclusively affected, in which case the disease becomes sufficiently distinct to allow of easy detection. The leading symptoms are acceleration of the pulse, occasional fever, especially towards evening, loss of color and flesh, derangement of the digestive organs (constipation or diarrhea, and occasional vomiting), a steady pain in the region of the navel, increased by pressure; but perhaps the most characteristic symptom is tumefaction and hardness of the abdomen, with general emaciation. The enlarged glands can sometimes be detected by a careful examination with the hand, especially in advanced cases. The progress of the disease is generally slow, but at length hectic fever sets in, the emaciation becomes extreme, dropsical effusion appears, and the patient dies exhausted, if not cut off by the access of some acute inflammation.

The treatment mainly consists in the administration of cod-liver oil, or, if the stomach is too irritable to bear that medicine, of iodide of potassium, combined with some bitter infusion, the bowels being at the same time carefully attended to. The application of stimulating liniments, or of iodine ointment, to the abdomen is often of great service. When the disease has advanced to a considerable extent, remedies are of little use, except to palliate some of the more urgent symptoms.

Independently of the disease that has just been noticed, inflammation of these glands is by no means uncommon when the mucous membrane of the small intestine is ulcerated, as, for example, in typhoid or enteric fever.

ME'SHA, king of Moab in the reigns of Ahab and his sons Ahaziah and Jehoram, kings of Israel, and tributary to the first. He seized the opportunity afforded by the confusion which followed Ahab's death, and the feeble reign of Ahaziah, to shake off the yoke of Israel, and free himself from the heavy tribute imposed upon him. Jehoram,

on succeeding to the throne of Israel, secured the aid of Jehoshaphat, king of Judah, his father's ally, to reduce the Moabites to their former condition of tributaries. The united armies of the two kings were joined by the forces of the king of Edom. The Moabites were defeated. The king took refuge in his last stronghold, and having in vain attempted to force his way through the besieging army, he, in the madness of despair, withdrew to the wall of the city, and in the sight of the allied host offered up his first-born son and successor as a propitiatory sacrifice to Chemosh, the cruel fire-god of the Moabites. The bloody deed had the desired effect of causing the besiegers to retire to their own land. On withdrawing, however, they ravaged the country, and carried off much spoil. The Moabite stone (q.v.) is a memorial of this king.

ME'SHID, an important city of Persia, capital of the province of Khorassan, in a fertile and well-cultivated plain, on the Tejend, in lat. 36° 17′ n., long. 59° 40′ east. It is by far the most important town of the n.e. of Persia, being the center of numerous converging routes. The city presents a surprising and beautiful view from a distance. Above the walls, which are of vast circuit, shine the gilded dome of one of the most splendid mosques of the east, the beautiful minarets of the tomb of Imaum Riza, a follower of Ali, and the summits of other sacred buildings. Meshid, as the chief seat of the great sect of the Shiites, is of nearly equal importance with Mecca, the sacred city of the orthodox Mohammedans, and hence it abounds in "holy" men, arrayed in green turbans and sashes, who instruct the pilgrims visiting the city. The town carries on manufactures of woolen goods and of metal-wares, especially sword-blades, gold-work, and articles of jewelry. It is a famous place of pilgrimage, and a center, to some extent, of education. Caravans arrive almost daily. Pop. 70,000. In the neighborhood are the ruins of Thus, the old capital of Khorassan, which contains the tomb of the celebrated poet Firdûsi.

MESIL'LA, a t. and valley on the Rio Grande, New Mexico, U. S., acquired of Mexico in 1834 by purchase under the Gadsden treaty. Lat. 32° 17′ n., long. 106° 45′ west. It is a narrow, but fertile valley, on the southern overland route to California. The town, settled in 1850, had in 1870 a population of 1578.

MESMER, FRANZ (according to others, FRIEDRICH-ANTON), the founder of the doctrine of animal magnetism (q.v.), or mesmerism, was born in 1733 or 1734 at a village near the Bodensee. He studied at Vienna, and there took the degree of doctor of medicine in 1766. About 1772 he began, along with father Hell, to investigate the curative powers of the magnet, and was led to adopt the opinion that there exists a power similar to magnetism, which exercises an extraordinary influence on the human body. This he called animal magnetism, and published an account of his discovery, and of its medicinal value in 1775. Honors were conferred upon him in Germany. In 1778 he went to Paris, where he attracted much attention. His system obtained the support of members of the medical profession, as well as of others; but he refused an offer of an annual pension of 20,000 livres (about £800) to reveal his secret; and this, combined with other circumstances, gave rise to suspicion, and induced the government to appoint a commission, composed of physicians and naturalists, whose report was unfavorable to him. He now fell into disrepute, and after a visit to England retired to Meersburg, where he spent the rest of his life in complete obscurity. He died Mar. 5, 1815.

MESMERISM (*ante*). The following is the account given by Mesmer of the agent by which he claimed to produce the phenomena which distinguished his experience and practice: "Animal magnetism is a fluid universally diffused; it is the medium of a mutual influence between the heavenly bodies, the earth, and animated bodies; it is continuous so as to leave no void; its subtilty admits of no comparison; it is capable of receiving, propagating, and communicating all the impressions of motion; it is susceptible of flux and reflux. The animal body experiences the effects of this agent; by insinuating itself into the substance of the nerves it affects them immediately. There are observed, particularly in the human body, properties analogous to those of the magnet; and in it are discerned poles equally different and opposite. The action and the virtues of animal magnetism may be communicated from one body to other bodies, animate and inanimate. This action takes place at a remote distance without the aid of any intermediate body; it is increased, reflected by mirrors; communicated, propagated, augmented by sound; its virtues may be accumulated, concentrated, transported. Although this fluid is universal, all animal bodies are not equally susceptible of it; there are even some, though a very small number, which have properties so opposite that their very presence destroys all the effects of this fluid on other bodies. Animal magnetism is capable of healing diseases of the nerves immediately, and others mediately. It perfects the action of medicines; it excites and directs salutary crises in such a manner that the physician may render himself master of them; by its means he knows the state of health of each individual, and judges with certainty of the origin, the nature, and the progress of the most complicated diseases; he prevents their increase, and succeeds in healing them, without at any time exposing his patient to dangerous effects or troublesome consequences, whatever be the age, the temperament, and the sex. In animal magnetism nature presents a universal method of healing and preserving mankind." (*Mémoire sur la Découverte du Magnetisme Animal*, par M. Mesmer, Paris, 1779, p. 74 et seq).

In presenting any question for consideration and discussion it is simple fairness to

permit each side to exhibit its position after its own manner. It is matter for reflection that this statement by Mr. Mesmer has never been authoritatively controverted by any of the numerous opponents whom it has met in the century which has elapsed since it was first promulgated. It should first be remembered as to Mesmer that he was undoubtedly very much of a charlatan; and that partly from the character of his temperament, and partly from the nature of his surroundings, he accompanied his practice by methods which were designed to be striking and dramatic, rather than scientific; and to cloud with an appearance of mystery, and even supernaturalism, processes which were in themselves of the simplest character. The shrewdness of this operator is seen in his careful provision for accidents, and for the unsuccessful termination of any of his experiments or treatment by the explanation that although the fluid is universal in its scope, there are persons obnoxious to its exercise, who can prevent its influence. It should further be noted that the sweeping conclusions of the commissioners appointed by the French government to investigate the validity of Mesmer's pretensions—among which commissioners was Benjamin Franklin—were afterwards qualified materially by the decision of a second commission of no less importance as to the ability of its membership. And it remains to be said that the distinct assertions of Mesmer as to the power of some occult force which he terms animal magnetism have been sustained over and over again by actual experiment and practice; while new features and new developments of the nature of this force have been made known to us within the present generation. The theory that the cause of the phenomena produced lies in the principle of *suggestion* is set at rest positively by the fact that subjects have been influenced without the proximity of the operator, and even when the latter was miles distant from them. The point as to its efficacy in disease has been tested numbers of times with success. So far has this been the case that in India amputations have been conducted while the patient was under this influence, and this in the presence of valid witnesses, and successfully. The idea of any other than a psychological control being exercised is disposed of by the remarkable phenomena of phreno-mesmerism, by which certain faculties and propensities have been made to display themselves, by irritation of the corresponding organs of the head, and in cases where the subject was utterly ignorant of the nature and details of phrenology as enunciated by Gall and Spurzheim. The fact that such eminent scientists as Elliotson, Braid, Reichenbach, and Carpenter have added their testimony as to the existence of a certain subtle fluid, such as is described by Mesmer, is not without its bearing on this question. Baron Reichenbach, an eminent German chemist, experimented in great detail with magnets and crystals, and claimed to have demonstrated the fact of the existence of such a fluid, which he termed *od* or the *odic* force, and which he alleged could be brought into exercise in the case of a certain class of subjects termed *sensitives*, by employing these objects. His plan was the use of passes, making these, however, by means of the magnet or the crystal instead of the hand; the result being to throw the subject into a cataleptic condition, accompanied by the occurrence of phenomena similar to those otherwise attributed to animal magnetism. Braid, by the use of a brilliant object fixed to the forehead, in such a position as to distort the vision when the eyes were directed towards it, produced an identical condition (see HYPNOTISM). It will be remembered in this connection that the Hindu devotee, desirous of achieving the condition *Nirvana*, abstracts his attention from surrounding things, and fixes it upon the pit of his stomach. It has been a common method in the practice of mesmerism, instead of employing passes, to direct the subject to fix his attention and his gaze on a bright object—a ring, for instance—held in his hand, the hand resting on his knee as he sits in a comfortable position. In the use of this plan the result has been found to be precisely the same as that gained by the employment of passes.

A German writer, Kluge, has given the following classification of the effects observed in mesmerized subjects: 1. Called *waking*. Presents no very remarkable phenomena. The intellect and the senses still retain their usual powers and susceptibility. 2. Half-sleep, or imperfect crisis. Most of the senses still remain in a state of activity, that of vision only being impaired, the eye withdrawing itself from the power of the will. 3. The magnetic or mesmeric sleep. The organs of the senses refuse to perform their respective functions, and the patient is in an unconscious state. 4. The perfect crisis, or simple somnambulism. In this stage the patient is said to "wake within himself," and his consciousness returns. He is in a state which can be called neither sleeping nor waking, but which appears to be something between the two. 5. Lucidity, or lucid vision. This is called, in France, *clairvoyance;* in Germany, *Hellsehen*. In this state the patient is said to obtain a clear knowledge of his own internal mental and bodily state, is enabled to calculate with accuracy the phenomena of disease which will naturally and inevitably occur, and to determine what are their most appropriate and effectual remedies. He is also said to possess the same faculty of internal inspection with regard to other persons who have been placed in mesmeric connection (*en rapport*) with him. 6. Universal lucidity; German, *allgemeine Klarheit*. In this state the lucid vision becomes greatly increased, and extends to objects whether near or at a distance. To this very accurate catalogue we should add a condition—7. Coma. Into this state the patient falls who has been permitted to escape from the influence of the will of the operator. He no longer responds to command, he is apparently unconscious, his pulse recedes to the vanishing-point, and his heart-beats cease to be noticeable. This state closely simulates death, and is believed

to be actually premonitory of dissolution. Cases have occurred in which it has required the utmost exertion of all the methods known to those who practice mesmerism to restore to consciousness patients who had reached this condition.

The mesmeric state has been applied mostly to the cure of disease, for which purpose it was used by Mesmer when it first attracted public attention. It has also been used for the purpose of producing sleep during surgical operations; and Miss Martineau relates a case of one of her servants, who when in the mesmeric condition was said to be able to predict future events. The class of diseases which have been cured by its means are those which are known to medical men as functional nervous diseases. Various nervous diseases, such as paralysis, epilepsy, etc., occurring from changes in the structure of various organs, are not susceptible of benefit from the mesmeric state. It is in those cases where no structural lesion can be supposed to exist, and which often yield to sudden changes of the mind from various causes of excitement, and which frequently cease without obvious cause, that the disease has yielded to this remedy.

In 1836 Mr. Colquhoun published in London a work on animal magnetism, entitled *Isis Revelata*, which attracted considerable attention to the subject, and which contained as an appendix a translation of the report of the second French commission appointed to investigate this subject in 1831, and to which we have already referred. This was followed by the arrival in London of baron Dupotet, who performed many experiments, some of which were witnessed by Dr. Elliotson, who immediately undertook the further investigation of the subject. The results of the experiments of Dr. Elliotson, which were published in the *Lancet*, produced a great sensation, and phenomena which had hitherto been regarded as impossible were constantly produced. In 1841 M. La Fontaine, a Frenchman, visited London, and gave public lectures on mesmerism and examples of its phenomena. A number of persons claiming to be "professors" of animal-magnetism, or electro-biology, have from time to time given public exhibitions in the cities and towns of the United States and the British provinces in America. In these exhibitions the object has been to exhibit voluntary patients placed under the control of the operator, and to display the various phenomena which could then be produced. These have been always simple in their nature, and of a character to amuse more than to instruct. No scientific man had given himself to the investigation of this subject to any important extent in America until, during the winter of 1880–81, Dr. George M. Beard, of New York, a member of the Neurological society, and a man qualified by the nature of his studies and experience, and his avowed skepticism on this subject, to undertake its investigation with a mind at least free from bias in its favor, commenced a series of experiments, and eventually conducted certain of these in public. These experiments were none of them novel in character, except possibly that of showing the insensibility to the most powerful light of the eye of a patient in a mesmeric condition. The experiments were all conclusive as to the nature of the phenomena produced, but the inferences reached by the experimenter and those who witnessed them as to their occasion and origin have not been made public at the time of this writing. But the bald facts of the phenomena have never been disputed by intelligent investigators. Only those unaccustomed to profound investigation have set these down as the result of self-deception or of collusion. It still remains to be discovered what influence produces the conceded result, and to what extent, if at all, the human will is engaged in the matter. Something suggestive as to these points might be stated in this wise: that a subtle force pervades creation and envelops the earth, with the other planets; that this force performs specific duties in connection with vitality, and in the form of a positive ether becomes visible under certain conditions, and in the case of animals, including human beings, more readily so to those possessing certain natures and temperaments (sensitives); that this force may be and is exerted without sensible regard to time or distance; that it is subject to evolution and direction by the human will; that it is concentrated in certain material forms, as in the magnet and the crystal, and in certain atmospheric and meteorological conditions, as in snow-storms; that it is correlated with the other forces and, like these, is one of the modes of motion; that it is more elevated in its character than any of the simply material forces; because it responds to mental impressions and psychological influences; that it includes all the forms and modes of expression of all the subordinate, or strictly material, forces; that thus it is enabled to act upon things animate or inanimate, material as well as immaterial, thus accounting for the phenomena of table-tipping, so-called "spiritual" rapping, etc.; that it may even exhibit or manifest conditions simulating intelligence, wherein would appear one explanation of these phenomena in the practice of spiritualism; finally, that it is superior to material laws, whence the phenomenon of levitation, that of untying impossible knots, etc. As suggestions, merely, these may awaken interest in the general subject.

Oersted says (*Soul in Nature*), "Everything in science prevailing throughout a certain period contains actual scientific truth, though frequently much obscured." The fact that mesmerism, or animal-magnetism as it may more properly be termed, has continued to affect mankind as a possible scientific fact during more than a century of pronounced opposition, would seem to bring it within the category signified by Oersted. And in these days of investigation into the nature of things, and when such extraordinary discoveries are constantly being made as to the limitless nature and scope of the natural forces, it would appear proper to devote a certain fair degree of scientific skill and

patience in the direction of elucidating the nature and origin of such remarkable phenomena. See ANIMAL MAGNETISM, *ante*.

MESNE LORD is, in English law, a lord who is himself a tenant to some other lord, called a lord paramount. The phrase is, however, not now used, because subinfeudation was abolished in the time of Edward I.—MESNE PROCESS was the name given to writs which issued in respect of a pending action before final judgment was given.—MESNE PROFITS are the profits or rents drawn by a person who is wrongfully in possession of real property, and who is afterward ejected, in which case the mesne profits are recoverable, along with the estate itself.

MESOPOTA'MIA (Gr. *mesos*, middle, and *potamos*, a river), the region between the Euphrates and the Tigris; but the name is generally applied to the northern part of this region, which is called by the Arabs Al-Jesira (the island). The northernmost districts of Mesopotamia are mountainous, being penetrated by the southern spurs of the mountains of Armenia; all the rest is a plain, rarely broken by rocky heights. This plain is dry steppe, green with vegetation only in the wet season; but wherever it is naturally watered or artificially irrigated it displays fertility. The inhabitants consist chiefly of Turks, Kurds, Turcomans, and Yesids, with Armenians in the n. and Syrians and Arabs in the plains. The chief occupation of the people is the feeding of cattle; and of the civilization of ancient times, or even of that which prevailed in a later period (during the Ayubite rule), few or no traces now exist. Mesopotamia forms a part of the Turkish empire, and is divided into several eyalets, or governments. For the history of the country, see ASSYRIA, BABYLONIA.

MESOZO'IC (Gr. middle-life), a term introduced by prof. Phillips to designate the group of geological periods, the fossil remains of which differ equally from those of the paleozoic (ancient-life) and cainozoic (newer-life) epochs. It is synonymous with the more generally employed term secondary, and includes the rocks of the triassic, oölitic, and cretaceous periods.

MES'PILUS. See MEDLAR.

MESQUITE GRASS, a procumbent pasture-grass, abundant in the s.w. part of the U.S., and belonging to the genus *aristida*.

MESQUITE TREE. See MEZQUITE TREE, *ante*.

MESS (Fr. *mets*, Old Fr. *mes*, Ital. *messo*, a dish, from Lat. *missum*, sent or served up), originally signified a dish or portion of food; but is used in the British army and navy in the sense of a number or association of officers or of men taking their meals together. In societies consisting entirely of the male sex, and of one set of men continually thrown together, it is a very important social point that the mess should be well regulated. There are consequently stringent rules—both of the service and of mutual etiquette—laid down for its government. One officer acts as caterer, receives subscriptions from the several members, charges the wine to those who drink it, etc.; a steward has charge of the more menial department, arranging for the cooking, purchase of viands, servants, rations, etc.

In the navy, the admiralty lend the plate and glass; in the army such expenses are met by the mess fund, which is kept up by a contribution not exceeding thirty days' pay, or difference of pay, on the appointment or promotion of an officer, and an annual subscription from each officer not exceeding eight days' pay, which subscription, in the case of subalterns, is, since 1872, paid by the state. Of course, each officer has to pay periodically his share of the general expense for provisions, etc. In the navy, this expense is limited to £3 a month per head for the ward-room mess, and £1 10s. in the gun-room. In the army, there is no specific limit, but commanding officers are enjoined to enforce proper economy. Government assists the mess of regiments serving at home, and on certain foreign stations where the necessaries of life are expensive, with an annual allowance of £25 for each troop or company. The whole of this allowance is to be applied in aid of the cost of the first allowance of wine, and towards reducing the daily expense of the mess, etc. The annual vote for this allowance is about £40,000.

In regiments, there is the officers' mess, to which all the officers of the regiment are bound to subscribe their regulated entrance-fee; but it is optional with married officers to use it or not, and if they elect not to do so they are exempted from the annual contribution, and only pay for their share of the consumption on the special occasions when they may attend. The sergeants have also a mess, when the comanding officer can succeed in establishing one. It is considered necessary for discipline that these messes should be quite exclusive, though, in continental armies, and especially the French, the case is different, the utmost familiarity being encouraged between all ranks when off duty. The social equality of officers and men, due to conscription and promotion from the ranks, suffices to account for the difference of system. The sergeants draw their *rations* (q.v.), supplementing them at their discretion; the officers can draw them or not (through their messman), but on foreign stations they almost invariably do so.

There is no mess for staff-officers with an army, unless they form private arrangements among themselves.

In the British navy, if the ship be small there is one general mess—the gun-room—to which all the officers must belong. If the vessel have a considerable complement, there

is the ward-room mess (of which the captain is not an effective member, as he dines in his own suite of cabins), for the commander, lieutenants, master, chaplain, paymaster, marine officers, surgeon, assistant-surgeon, and chief engineer; the gun-room for sub-lieutenants, second masters, midshipmen, cadets, and master's assistants; and the engineers' mess (governed by the rules for the gun-room), for engineer officers below the rank of chief engineer. Officers or civilians voyaging in a ship of war as passengers are ordinarily elected honorary members of the mess to which their rank would entitle them. Rations are not issued to members of a mess; but each is granted, in lieu thereof, an allowance of £1 a month, with the power of purchasing ship's provisions at government rates.

Common seamen and common soldiers in the navy and army, respectively, *mess* together in tables comprising a certain number, according to their ratings or squads; but this has no reference to the technical meaning of messing as applied to officers, and is merely for the purpose of economy of fuel and labor in the cooking of their rations.

MESSALI'NA, VALERIA, the daughter of Marcus Valerius Messala Barbatus and wife of the Roman emperor Claudius, a woman infamous for her lasciviousness, her avarice, and the atrocities which she perpetrated. Taking advantage of the weakness and stupidity of the emperor she played the adulteress without restraint, and unrelentingly caused all to be put to death who stood in the way of her unhallowed gratifications. The best blood of Rome flowed at her pleasure. Among her victims were the daughters of Germanicus and Drusus, Justus Catonius, M. Vincius Valerius Asiaticus, and her confederate Polybius. She went so far in vice as to offer her charms for sale like a common prostitute; and at last, during a temporary absence of the emperor, she publicly married one of her favorites, C. Silius, upon which Narcissus, one of the emperor's freedmen, represented to him that Messalina was aiming at his destruction, and received orders for her execution. She was put to death by Enodus, a tribune of the guards, in the gardens of Lucullus, 48 A.D. Her name has become a by-word for crime and lust.

MESSA'NA. See MESSINA, *ante*.

MESSAPIA, the name given by the Greeks to the peninsula in the s.e. part of Italy, and called by the Romans Calabria. It was known to the Greeks also by the name of Iapygia. There were two tribes, the Salentini on the s.e. coast near Tarentum, and the Calabri in the n.e. These last the Greeks called Messapians. They were the most powerful, and from them the whole district was called Calabria and Messapia. It was very fertile and celebrated for its wine, olives, and other fruits. The Calabrian horses and the Tarentine cavalry were famous. The inhabitants occupied the cities of Hyria and Brundusium in the 8th c. B.C., when the Greek colony was founded. They fought against the Tarentine colonists and defeated them in a great battle about 473, but gradually yielded to the Greeks. In union with other tribes under the command of Pyrrhus they opposed the Romans, but after his fall were subdued in a single campaign. In the second Punic war they revolted to Hannibal, but were soon conquered.

MESSE'NE, capital of Messenia, in the Peloponnesus, founded by Epaminondas, 371 B.C. It was situated at the foot of Mount Ithome, on both sides of the Black springs. So great were the zeal and activity of the Thebans and their allies that it was completed and fortified in 85 days. The walls of the city were of stone, exceedingly strong, and well supplied towers and buttresses. The citadel was on Mount Ithome, famous in history for the protracted defense which the Messenians made in their last revolt. It was with the Acropolis the strongest city, next to Corinth, of the Peloponnesus. It was supplied with water from a fountain called Clepsydra. The city was named from the wife of Polycraon, one of the earliest rulers of the country. The ruins of it are visible at the modern village of Mavromati.

MESSENGERS, KING'S (QUEEN'S), officers employed by secretaries of state to convey dispatches at home and abroad. In former days their occupation consisted, to a considerable extent, in serving the secretaries' warrants for the apprehension of persons accused of high treason and other grave offenses against the state, nor was it unusual for them to keep the prisoners whom they apprehended at their own houses. They are now principally employed in foreign service.

MESSENGERS-AT-ARMS, the officers who execute the process and letters of the courts of session and justiciary in Scotland. They are appointed by, and are under the control of the Lyon king-at-arms (q.v.). Act 1587, c. 46, contains various provisions regarding these officers, which show that, prior to that period, the Lyon exercised jurisdiction over them, both as to their admission and the trial of complaints against them. There are a certain number of messengers-at-arms in every county of Scotland, amounting in all, at present, to about one hundred.

MESSE'NIA, a district in the s.w. of the Peloponnesus, bounded on the e. by Laconia, on the n. by Arcadia and Elis, and on the s. and w. by the sea. It was composed chiefly of extensive plains, watered by the *Pamisus* and other streams. Those plains were famous for their fertility, and particularly for their wheat-harvests. At an early period, after the Doric conquest, it rose to power and opulence. Its chief cities were Messene, Methone, and Pylos. It is chiefly noted for its two wars with Sparta, known

as the Messenian wars, the first of which (according to the common chronology) lasted from 743 to 724 B.C.; and the second from 685 to 668 B.C. In both instances the Messenians were defeated, and in consequence a great part of them emigrated to Sicily, where they took possession of Zancle, which then received the name of Messana, the present Messina. After the lapse of 300 years Epaminondas invited their descendants back to Greece, and they joyfully responded to his invitation. Messenia is the name of one of the *nomarchies* of the modern kingdom of Greece.

MESSER, ASA, D.D., LL.D., 1769–1836; b. Mass.; graduated in 1790 at Brown university, in which he was tutor in 1791, professor of languages in 1796, of mathematics and natural philosophy in 1799, and president 1802–27. He was licensed to preach by the First Baptist church in Providence; ordained in 1801, and preached occasionally, while professor and president, for churches of different denominations. After retiring from the presidency he was elected to several city offices by the people of Providence. He published several discourses and orations.

MESSERVE, NATHANIEL, d. 1758; b. N. H.; a ship-builder; one of the 304 New Hampshire men who went, in 1745, with the British forces to besiege the fortress of Louisburg, Nova Scotia, at the sight of whom the detachment of the royal battery on the shore spiked their guns and fled. He was lieut.col. of col. Moore's regiment, and rendered important service. He was present at the attack on fort Edward, in command of the New Hampshire regiment, and bravely defended the position. In 1756 he commanded the New Hampshire troops on the expedition to the French post of Crown Point, on lake Champlain. In 1758 he set out with the second expedition, under gen. Amherst, to Louisburg, then defended by the chevalier de Drucourt, but died of small-pox before reaching his destination. His son George held offices under government in New Hampshire and Massachusetts, having been appointed stamp agent in the former state and collector in Portsmouth and Boston. During the revolution George espoused the tory cause, and went to England in 1777.

MESSI'AH (Heb. *Mashiach*), equivalent to the Greek *Christos*, the Anointed, designates, in the Old Testament, the great deliverer and Savior whom the Jews expected to be sent by God, not only to restore their country to the power and splendor which it exhibited in the days of David, but even, by compelling the Gentiles to acknowledge the supremacy of the theocratic people, to raise it to the summit of universal dominion. This large conception, however, first begins to develop itself after the time of Solomon; for the oldest biblical records in their Messianic indications refer rather to the high degree of prosperity which the chosen people were to expect *for themselves*. This expectation, already visible in the Abrahamidæ, appeared for a moment to have realized itself in the conquest of Canaan; but the subsequent, and often disastrous wars (in the period of the "Judges" and of Saul), as well as the internal feuds and dissensions of the Hebrews themselves—left it, in point of fact, unfulfilled. Nevertheless, the hope of the appearance of the Messiah had rooted itself strongly in the people, and, during the glorious and peaceful reigns of David and Solomon, had so grown and enlarged that even after the secession of Israel, and during the momentous ages that elapsed until its destruction as a kingdom, not only was the hope of a universal world-sovereignty, and of an extraordinary degree of prosperity, warmly cherished, but it was also confidently expected that God would raise up a branch from the stem of David as the Messiah, the founder of the national prosperity, and the bringer-in of the all-embracing theocracy. That branch was declared to be "the anointed of the Lord," and since David applied that epithet to himself, the Jews transferred it to the deliverer whom they expected, and called him "Son of David." The prophetic writings contain many such allusions to the Messiah, whose coming was expected shortly, and even during the time of the generation then living, whose birthplace, in congruity with his Davidic descent, was announced to be Bethlehem and who, it was believed, was to be endowed with divine attributes. These prophetic allusions are commonly termed MESSIANIC PROPHECIES. Along with such, the prophets associated the idea of a forerunner (Elijah, Jeremiah, or Moses), whose function was to prepare the people for the appearance of the Messiah. The coming of the Messianic kingdom was to be preceded by a period of severe misfortune and bitter sorrows, the purpose of which was the reconciliation of the people with God (Isaiah i. 25, etc.; Joel iii.; Dan. ix.; Zech. xiii.). These sorrows are called the woes of the Messiah; they are minutely described in the second book of Esdras—an apocryphal work. Hence sprung up the idea of a suffering Messiah—widely diffused among the Jews—who, by enduring grief and shame, should make atonement for the people, and reconcile them with God. This conception was greatly strengthened by the picture in Isaiah (chapters lii. and liii.), of a "servant of God," which, in fact, is generally regarded as the most distinct prophecy of the Savior. Hence the step further of considering the Messiah an offering and sacrifice for the sins of the people was an easy one; yet, on the other hand, it is singular that no trace of this is found in the Apocrypha, not to mention the popular belief of the Jews, that the Messiah was to live forever (John xii. 34), that a crucified Savior was a stumbling-block to them (1 Cor. i. 23), that even the disciples of Jesus did not comprehend his allusions to his death, and that their faith in him as the Messiah was for long dim and doubtful. In fact, this popular belief of the Jews was the very reason why they did not

recognize Jesus as the Messiah. In the later Judaism (as it shows itself in the Talmud) the conceptions of the Messiah are rich in singularities. It was believed that the *true* Messiah, the son of David, would be preceded by another Messiah, a son of Joseph or Ephraim, who should suffer death for men as a sin-offering. Century after century the Jews have expected the former, and repeatedly have they risen and placed themselves under the standard of dreamers, fanatics, and impostors, who took to themselves the sacred name; as, for example, Bar-Cochba (q.v.) in the 2d. c.; one Moses in the isle of Candia in the 5th c.; one Julian in Palestine in the 6th c.; several in Persia and Arabia in the 12th c.; and as late as the 18th c., Sabatai Zevi in Aleppo. Even yet the hope of a Messiah is not dead in the hearts of the strict Talmudistic Jews.

The *crucial* question of theology, however, is not the form in which the doctrine (so to speak) of the Messiah was held by the Jews. All rational students of Scripture, whether "orthodox" or "heterodox," now admit that its growth was gradual, and that it acquired precision and definiteness of outline in the course of ages from its first rude phase, among the pastoral princes of the Syrian wilderness, down to that sublime yet shadowy personality—the Man of Sorrows—that continually floats before the vision of the "Younger Isaiah." The grand question is, Was this doctrine essentially a divine inspiration, an objective truth of God, or only a lofty conception of the religious soul? The strict rationalistic theologians maintain—and endeavor to prove by an analytic examination of the Gospels—that Jesus assumed the dignity of Messiah either to accommodate himself to a rooted conception of his countrymen, or partly because he had come to believe it himself—a conclusion, it is said, at which he might arrive quite honestly, since he felt that the *truth* which he taught was the real and only "kingdom of God," and that therefore he was justified in applying to himself all that was said (tropically) by the prophetic poets in old times concerning him who should usher in this "golden age" of the world's faith. The mass of orthodox theologians, on the other hand, regarding the so-called Messianic prophecies of the Old Testament as positive, divinely suggested (perhaps, even on the part of their author *conscious*) predictions of Jesus Christ, repudiate the principle of accommodation, or even spiritual application, and try to show that the Savior accepted the Messianic prophecies as literally and exclusively applicable to him. The historico-spiritual school, represented in Germany by men like Neander, Rothe, Tholuck, etc., and in England, generally speaking, by the divines of the "broad church" party, occupy a middle position between these two extremes: with the rationalists, they hold that the Old Testament doctrine of the Messiah was gradually developed, contains many human elements, and does not imply any knowledge of the historical Jesus on the part of those who announce it; with the "orthodox," on the other hand, they assert that the doctrine is the expression of a fact, not of a sentiment—that Jesus of Nazareth was actually the Son of God, the appointed Messiah, and that in him the so-called Messianic prophecies were fulfilled in a far higher sense than ever the prophets could have dreamed. It will thus be seen that the rationalists resolve the doctrine of the Messiah into a merely *subjective* religious idea; while the orthodox, and also the historico-spiritual school of theologians, hold that the doctrine was the expression of a divine fact —the *substance* of a heavenly faith.

MESSI'NA, a province in n.e. Sicily separated from the province of Calabria, in Italy, by the straits of Messina, and supposed to have been cut off from the main-land by an earthquake before the historic period; 1768 sq.m.; pop. 420,649. It includes the Lipari islands, lying n.w. of it, in the Tyrrhene sea; its coast is washed by the Ionian sea, and its s.w. boundary is the base of Mt. Etna. It contains the Neptunian range of mountains, part of the Peloric chain, which traverses the n. of Sicily. Its surface is diversified by fertile valleys, which are irrigated by heavy torrents that descend on either side of the mountains in the rainy season, but are dried by the heat of summer. Its productions are wheat, flax, argol, corn, fruits, hemp, nuts, oil and the red Faro wine; among the exports is the cordial called *vino-cotto* from Milazzo. Sulphur is found in large quantities; also granite, quartz, and mica. Its coast presents a varied outline, the town of Messina on the right of cape Faro, or Pelorus, at its extreme n.e. point, occupies the section of the coast line called from its form the "sickle," having a convenient harbor with spacious wharves defended by a fort. The whole country has been racked by wars and shaken by earthquakes, and the cities have a modern appearance, having been, in most cases, rebuilt. It is drained by the Monforte, San Antonio, and other small streams. It is divided into 4 distrelli and 116 communes. On a projection called cape Milazzo in the n. portion the sea-port town of Milazzo is built, whose inhabitants are sailors and fishermen, and the vine and olive are cultivated. Taormina, built on a steep towering cliff, overlooks the sea on the e., and contains many interesting ruins. On the n. coast are profitable manufactures of earthenware, and a Norman castle; and so substantially have the military works been laid on the natural defenses that it has been considered the Gibraltar of Sicily, and has been the scene of many ancient and modern wars. The province contains many churches and convents, and relics of antiquity of great interest, cenotaphs, tesselated pavements, etc. Its principal city of Messina, the terminus of a railway along the coast to Syracuse, is nearly opposite Reggio (ancient Rhegium), which is 9 m. s.e. across the straits of Messina, the most noted city of s. Italy.

MESSI'NA, a city of Sicily, chief t. of the province of same name, one of the most ancient and most important cities of the island, is charmingly situated on the strait of Messina, encircled by a zone of abrupt conical rocks, and commands a view of Calabria. Pop. in '71, 71,921. The town is inclosed by old walls, and has several fine squares and wide lava-paved streets. The harbor, which is formed by a projecting tongue of land curved in the form of a sickle (whence its primitive name, Zancle—Gr. sickle—see MESSENIA), is about 4 m. in circumference, and can contain a thousand ships; it is defended by a citadel and six forts; the depth is sufficient to admit vessels of large size; and the quays are spacious. The trade of Messina, chiefly in silk, oil, wine, coral, fruits, linseed, fish, etc., although less extensive than formerly, is still an important source of wealth to Sicily. The chief imports are cotton and woolen manufactures, hardwares, and other articles of colonial produce. The damasks and satins of Messina are excellent, and the fisheries important. Messina has steamboat communication with Naples, Marseilles, and Malta. In the 15th c. Messina was a renowned seat of learning; and in the 16th c. a famous school of painting was founded there by Pelidora da Caravaggio. In modern times it has undergone terrible vicissitudes, having been ruthlessly bombarded by the royal forces on several occasions during the war of independence in 1848.

MESSINA, STRAITS OF (Ital. *Faro di Messina*, Lat. *Mamertinum fretum*), between Italy and Sicily, are 22 m. in length, and vary from 2½ to 10 m. in breadth. A strong current runs through the strait, which is of great depth. See SCYLLA AND CHARYBDIS.

MES'SUAGE, the legal term used in English law to describe a dwelling-house and piece of land adjoining.

MESTI'ZO, a Spanish word meaning literally mongrel, derived originally from the Latin *mixtus*, and used in Spanish-American communities to denote the offspring of a white or creole and an Indian. A feminine form, *mestiza*, is also in use; and the word mestino is but another form of mestizo. In Mexico and Brazil are very large numbers of the mestizos, who are very light complexioned and have a remarkably clear skin, thin beards, and oblique eyes. The creole offspring of a mestiza and a white man differ very slightly from those of pure white descent. The child of a metiza mother and an Indian father is called mestizo-claro, and many of this class are of very remarkable beauty. The offspring of a mulatto and mestiza is a *chino;* of a negro and a mestiza, a mulatto-oscuro; and there are many other similar terms used by the whites to denote different admixtures of European, creole, Indian, and negro blood.

MES'TRÉ, a t. of northern Italy, in the province of Venice, and 5 m. n.w. of the city of Venice, on the margin of a lagoon. It is connected with Venice, Padua, and other places by railway. There are many villas around the town and along the road to Padua, reaching almost to that city. Mestre has a considerable transit trade. Pop. 8,500.

MÉSZÁROS, LÁZÁR, 1796–1858; b. at Baja, in Hungary. He at first studied theology, and afterwards became a law student in the university of Pesth. He became a volunteer in the Hungarian army in the war with Napoleon and gained a high reputation for gallant conduct in the campaigns of 1813–15. He rose gradually in rank, and in 1848 was col. of a hussar regiment, at which time Batthyáni became president of the new ministry, with Kossuth as minister of finance, and the rule of Metternich was overthrown. Mészáros was placed at the head of the war department, and though opposed to the adoption of extreme measures was most valuable in the reorganization of the Hungarian forces. Austria having declared its intention of subjugating Hungary, he left his place in the diet and took the command of the attempt against the Rascians in his native district, Bács. This proved a complete failure, and in Jan., 1849, his army was defeated with great loss before Kaschaw. In April of the same year the declaration of independence was issued; Mészáros was given an important command, and in conjunction with Dembinski led the patriot army which was defeated at Szöreg and Temesvár; he then fled to Turkey and was sentenced *in contumaciam* and hung in effigy by the Austrians. After residing for some years in England, France, and the island of Jersey, Mészáros emigrated to the United States, and became a citizen of Flushing, L. I. He died at Eywood, Herefordshire, England, while on his way to visit Switzerland.

METACEN'TRE. See HYDROSTATICS.

METAL (in heraldry). The field of the escutcheon and the charges which it bears may be of metal as well as of color; and the two metals in use among heralds are gold and silver, known as or and argent. It is a rule of blazon that metal should not be placed on metal, or color on color.

MET'ALINE, a metallic compound invented in 1870 by Dr. Stuart Gwynn of New York, and used in place of lubricants to counteract the friction of machinery.

MET'ALLURGY is the art of extracting metals from their ores. The operations are partly mechanical and partly chemical. Those processes which depend principally on chemical reactions for their results have reference chiefly to the roasting and smelting of ores, and are described under the heads of the different metals. But there are certain preliminary operations of a mechanical kind which metallic ores undergo, such as crushing, jigging, washing, etc., which we shall describe here, as they are essentially the

same for the ores of lead, copper, tin, zinc, and indeed most of the metals. (For IRON, see that head.)

Ores are first broken up with hammers into pieces of a convenient size for crushing or stamping. Waste material, such as pieces of rock, spar, etc., which always accompany ore, are as far as possible picked out by hand, and the ore itself arranged in sorts according to its purity. Various kinds of apparatus, such as riddles, sieves, etc., are then used for separating it into different sizes, in order to secure a uniform strain on the crushing machinery.

In one of the most approved forms of crushing-mills the ore is raised by means of small wagons to a platform, where it is ready to be supplied to the crushing-rollers through an opening. These rollers are mounted in a strong iron frame, held together by wrought-iron bars, and bolted to strong beams. Their distance apart is regulated by means of a lever to which a weight is attached. The bearings of the rollers slide in grooves, so that when any extra pressure is put upon them by a large or hard piece of ore, the lever rises, and allows the space between the rollers to widen. The crushed ore falls upon a series of sieves, which are made to vibrate. These have meshes increasing in fineness as they descend; and the upper two are so wide that pieces of ore too large to pass through them are conducted into the lower part of the bucket-wheel and raised again to the platform to be recrushed. The lower four sieves separate the remaining portion of the crushed ore into different degrees of fineness, which is collected in pits.

Instead of crushing-rollers, sometimes a stamping-mill is used, especially for tin ores, which require to be reduced to a fine powder. The stamping-mill consists of a series of upright shafts with a weighty piece of iron at the bottom of each. They are raised by means of an axle with projecting cams, and then, falling by their own weight, act like hammers.

After being crushed, the ore is washed and sifted on a jigging sieve. In one of its simplest forms the ore is placed on a table from which a sieve is filled. It is then immersed in a tub of water and a jigging motion communicated to it by a workman alternately raising and lowering a handle. This effects two purposes—it washes the ore, and separates the material into two layers: the upper consists of the lighter spar and other impurities, which are raked off; and the lower consists of the heavier and purer portions of the ore, which are now ready for the roasting furnace.

It will be apparent that in the bottom of the tub there must be a quantity of more or less valuable ore, which, from its fineness, has fallen through the sieve. This is called sludge or slime; and the minute particles of ore it contains are recovered either by simply forming an incline on the ground, and washing it with a current of water, or by using an inclined table called a *sleeping-table*. Ore which has been reduced to powder at the stamping-mill, as well as slime, is washed by this apparatus. The material is put into a chest which is placed in a sloping position, and is supplied with water on turning a stop-cock. The current carries the contents of the chest through an opening at the bottom, and spreads it, with the aid of a series of stops, or small bits of wood, over the surface of the table. A stream of water is then kept flowing over the table till the earthy impurities are all carried down into a trough, the pure particles of the ore remaining, by reason of their greater specific gravity, near the top of the table, whence they are removed to be smelted. Sometines the table is suspended by chains, and receives a succession of blows at the top from a *buffer*, moved by cams on the same principle as the stamping-mill. This arrangement is found of great advantage in dressing very poor ores.

The variety of machinery and apparatus used in dressing ores is very great, and they pass under different names in different districts, but they are all very similar in principle to those we have described.

METALS—METALLOIDS. Although each metal is considered in a separate article, there are various points regarding the general physical and chemical characters of these bodies, and the method of classifying them, which require notice.

It is not easy to define a metal. All the elements are usually divided by chemists into two groups—viz., the non-metallic bodies or metalloids, and the metals; the list of non-metallic bodies containing all those elements in which the characteristic properties of the bodies popularly known as metals (such as silver, gold, iron, etc.) are wanting; these characteristic properties being their metallic luster, their opacity, and their capacity of conducting heat and electricity. The non-metallic elements are 14 in number—viz., oxygen, hydrogen, nitrogen, sulphur, selenium, tellurium, phosphorus, chlorine, bromine, iodine, fluorine, carbon, boron, and silicon, of which five are gases, one a liquid, and the rest are solids at ordinary temperatures.

The division of the elements into these two great groups is, however, not based upon any definite scientific grounds, and it is still an open question whether some of the metalloids, as, for example, tellurium and silicon, should not be placed among the metals. The non-metallic bodies or metalloids being only remarkable as a group for their negative properties, require no special consideration, and we therefore proceed to notice the general properties of the metals.

The following are the most important of the *physical* properties of the metals:

1. All metals, unless when they are in a finely pulverized form, exhibit more or less of the characteristic luster termed metallic. Two of the non-metallic elements, iodine

and carbon, in some forms, present also a metallic luster. 2. All metals are good conductors of heat and electricity, although in very unequal degrees. 3. With the exception of mercury, all the metals are solid at ordinary temperatures. With the exception of gold, copper, calcium, and strontium, the metals are more or less white, with a tendency to blue or gray. Most of them have been obtained in crystals, and probably all of them are capable of crystallizing under certain conditions. 4. Metals are remarkable for their opacity, and, with the exception of gold, do not transmit light, even when they are reduced to extremely thin leaves. 5. All the metals are fusible, although the temperatures at which they assume the fluid form are very different (see FUSING POINTS); and some of them, as mercury, arsenic, cadmium, zinc, etc., are also volatile. 6. Great weight, or a high specific gravity, is popularly but erroneously regarded as a characteristic of a metal; while platinum, osmium, and iridium (the heaviest bodies known in nature) are more than 20 times as heavy as water, lithium, potassium, and sodium are actually lighter than that fluid. 7. Great differences are observable in the hardness, brittleness, and tenacity of metals. While potassium and sodium may be kneaded with the finger, and lead may be marked by the finger-nail, most of them possess a considerable degree of hardness. Antimony, arsenic, and bismuth are so brittle that they may be easily pulverized in a mortar; while others, as iron, gold, silver, and copper, require great force for their disintegration. Taking iron and lead as representing the two extremes of tenacity, it is found that an iron wire will bear a weight 26 times as heavy as a leaden wire of the same diameter. See DUCTILITY, MALLEABILITY. 8. It is a remarkable property of the metals that none of them are capable of being dissolved without undergoing chemical change. Sulphur, phosphorus, iodine, etc., may be dissolved, and after the evaporation of the solvent, may be reobtained with all their original properties; but this is never the case with metals.

Amongst the chief *chemical* properties of metals we next notice:

Their strong affinities to certain of the non-metallic elements. All the metals, without exception, combine with oxygen, sulphur, and chlorine, and often in several proportions, forming oxides, sulphides (formerly termed sulphurets), and chlorides. Many of them combine with bromine, iodine, and fluorine. The other compounds of this nature, excepting carbide (formerly carburet) of iron, or steel, and the hydrides of arsenic and antimony (commonly known as arseniuretted and antimoniureted hydrogen), which are of importance in toxicology, may be passed over without notice.

The metallic oxides are, without exception, solid bodies, insoluble in water, and usually present a white or colored earthy appearance. Hence the old name of *metallic calx* for these oxides.

Those oxides which are termed basic possess the property of directly uniting with the so-called oxy-acids (such as sulphuric, nitric, carbonic, and silicic acid), and of forming a new chemical compound of the second order, termed a *salt* (q.v.).

The compounds of the metals with chlorine, iodine, bromine, and fluorine, such, for instance, as chloride of sodium, or common salt (ClNa), are termed haloid salts (q.v.). The same metal may often combine both with chlorine and with oxygen in more than one proportion. For example, we have subchloride of mercury (Hg_2Cl); suboxide of mercury (Hg_2O); chloride of mercury (HgCl); oxide of mercury (HgO). For the compounds of the metals with sulphur, see SULPHIDES OF THE METALS.

Metals enter into combination with one another when they are fused together, and such combinations are termed *alloys* (q.v.), unless when mercury is one of the combining metals, in which case the resulting compound is termed an *amalgam*. It is doubtful whether all alloys are true chemical compounds. Definite compounds of the metals with each other do, however, certainly exist, and are sometimes found native, as, for example, the crystallized silver and mercury compound represented by the formula $AgHg_2$.

In consequence of their strong affinities for the metalloids, the metals are seldom found in a free or uncombined state, even in the inorganic kingdom, and never in animals or plants. The more common metals, in consequence of their strong affinity for oxygen and sulphur, are very rarely met with in the uncombined state; but some of those which are less abundant, such as gold, silver, and platinum, are found uncombined, in which case the terms *native* and *virgin* are applied to them; and other metals, as mercury and copper, occur both in a free and in a combined state. Many native alloys are found, but the ordinary sources of the metals are oxides, sulphides, chlorides, and carbonates, sulphates, and other salts. These are termed the *ores* of the metals. The methods of obtaining the metals from their various ores fall under the head of METALLURGY.

Various classifications of the metals have been suggested by different chemists. The following is probably one of the most convenient:

I.—The *light metals*, subdivided into—

1. The metals of the alkalies—viz., potassium, sodium, cæsium, rubidium, lithium.
2. The metals of the alkaline earths—viz., barium, strontium, calcium, magnesium.
3. The metals of the true earths—viz., aluminium, glucinum, zirconium, yttrium, erbium, terbium, thorinum, cerium, lanthanum, didymium.

II.—The *heavy metals*, subdivided into—

1. Metals whose oxides form powerful bases—viz., iron, manganese, chromium, nickel, cobalt, zinc, cadmium, lead, bismuth, copper, uranium, thallium.

2. Metals whose oxides form weak bases or acids—viz., arsenic, antimony, titanium, tantalum, niobium (or columbium), tungsten, molybdenum, tin, vanadium, osmium.

3. Metals whose oxides are reduced by heat—noble metals—viz., mercury, silver, gold, platinum, palladium, iridium, ruthenium, rhodium, osmium. (Several of the rare metals are here omitted.)

Another classification is that by which the metals are arranged in six groups, each group being named after a metal which possesses the common characters in a well-marked degree: viz., (1) the sodium group; (2) the calcium; (3) the iron; (4) the copper; (5) the platinum; and (6) the antimony groups.

METAMORPHIC ROCKS. Few of the deposits forming the crust of the earth remain in the condition in which they were deposited. By infiltration of a cementing fluid, by pressure, or by some other indurating agency, sand has become converted into sandstone, and clay and mud into shale. In some strata, this operation has been carried still further. There is a class of rocks, including gneiss, mica-schist, clay-slate, marble, and the like, which, while certainly of aqueous or mechanical origin, have, by intense molecular action, become more or less crystalline. To them, the convenient name metamorphic (Gr. transformed) rocks has been given by Lyell.

The metamorphic rocks were formerly considered to be the fundamental strata of the earth's crust. The original incandescent mass, it was said, losing its heat by radiation, a solid uneven crust of granite was formed. As soon as the ordinary atmospheric and aqueous agencies began to operate, a disintegration took place, and the abraded materials, carried down by the waters, were deposited in the basins which contained the boiling sea. It was thought that this not only accounted for the condition in which the metamorphic rocks now exist, but for the remarkable undulations and contortions so characteristic of these strata. Gneiss and the allied crystalline schists were accordingly placed as the lowest sedimentary strata in a division equivalent to the palæozoic period, and called the azoic, because they were destitute of organic remains, the conditions in which they were formed being opposed to the existence of animals.

It is now, however, known that metamorphic rocks occur as contemporaneous deposits in all epochs of the earth's geological history. In Canada and in the Hebrides, they are of Laurentian age; in the Highlands of Scotland, Cambrian and Silurian; in Devon and Cornwall, old red sandstone and carboniferous; and in the Alps, oolitic and cretaceous, and in some parts even tertiary. Although deposits of such various ages have been thus altered, the resulting rocks are in structure and composition very similar; their ultimate constituents do not differ from those of ordinary clays and sandstones. In all of them silica forms the largest proportion, consisting of about 60 to 70 per cent; alumina follows next, and then other substances in smaller quantities, such as lime, soda, potash, iron, etc. This similarity of composition, and the abundance of clays and sandstones, suggest the supposition that the metamorphic rocks may be nothing more than these deposits greatly altered; this is confirmed by many observed instances, in which aqueous strata are continuous with, and gradually change into, metamorphic rocks. The granite of Dartmoor has intruded itself into the slate and slaty sandstone, twisting and contorting the strata. Hence some of the slate rocks have become micaceous; others more indurated, having the characters of mica-slate and gneiss; while others, again, appear converted into a hard-zoned rock, strongly impregnated with feldspar. In some places in the eastern Pyrenees, the chalky limestone becomes crystalline and saccharoid as it approaches the granite, and loses all trace of the fossils which it elsewhere contains in abundance. These illustrations tell of changes occurring in the proximity of granite, and it has been consequently somewhat hastily concluded that this rock, coming up in a molten condition from below, has, by the radiation of its heat, produced the metamorphosis. But the observed stratigraphical position of granite, its sometimes passing by insensible degrees into gneiss, and the experiments of Solly and Bryson on its internal structure, show without doubt that this rock is, at least in many places, an extreme result of metamorphic action, and not the cause of it. To call the energy producing these results metamorphic or molecular action, is simply to hide our ignorance—we get a name, but nothing more. To speak dogmatically on a subject so obscure, is a sign of the same ignorance. The following, however, are the most probable agents that, together or separately, produced these remarkable changes:

1. *Heat.*—From whatever source derived, heat does exist, either distributed universally, or occurring locally in the mass of the earth; and where it exists, thermo-electric influences induce action, which, carried on over immense series of years, might produce in the end great changes. It is generally maintained that granite is the result of crystallization from perfect fusion, and that the strata converted into gneiss must have been reduced to a state of semi-fusion. But we know of crystallization taking place in the most compact amorphous solids without any approach to fusion, as in the axles of railway carriages; and of metamorphoric action without semi-fusion, as in the highly indurated bottoms of bakers' ovens, in which the clay is subjected to a long-continued though not a great heat; or in the sandstone floor of an iron furnace, which, from long contact with the molten iron, loses its color, becomes white and hard, and breaks with a porcelanic fracture, having, indeed, been changed into quartz rock. Besides, the frequent occurrence of cavities in the rock crystals of granite containing a fluid which fills

them only when the temperature is raised to at least 94° Fahr., shows that the crystal could not have been formed at a higher temperature. We are therefore safe in maintaining, that the heat was not in all cases so great as to produce fusion

2. *Pressure.*—This alone is sufficient to effect the consolidation and induration of aqueous deposits, converting clay or sand into solid stone. When heat is added to pressure, greater activity is likely to be the result. The undulatory movements of the earth's crust, by carrying down to great depths deposits formed on the surface, bring them under the influence of pressure, heat, and thermo-electricity, and at the same time elevate rocks that have been thus acted upon.

It is thought that heated water may be also a powerful agent, especially when it is subjected to great pressure.

These and other agents, then, operating through immense intervals of time, set in motion chemical attraction, whereby the various substances which entered into the composition of the sedimentary deposits rearranged themselves as they are found in the metamorphic rocks.

The description of the various metamorphic rocks will be found under their different names, viz., GNEISS, QUARTZITE, MICA-SCHIST, CLAY-SLATE, and MARBLE.

METAMOR'PHIC ROCKS (*ante*), geological formations which have undergone alteration of structure and sometimes of constitution. The subject of metamorphism has within a few years received much attention from geologists, and a great increase of knowledge has been the result. Rocks, such as granite, which were not many years ago regarded as primitive and older than all others, are now known to be of all ages and the result of changes or metamorphisms of other rocks. The word primitive is abolished in geology in its former absolute sense, and is only used to denote the first condition of any formation, whether old or recent. The general principles of metamorphism are treated in the article GEOLOGY. Metamorphic rocks are produced from the various sedimentary rocks, and also from volcanic products; but the chief source is the sedimentary rocks. The geological ages which have produced the greatest amount of metamorphic rocks are the Laurentian and Huronian. The Laurentian age commences in azoic time, and if the term primary could be applied to any formation it would be to the older of the Laurentian rocks; but it cannot be stated positively that they were the first formed, or, if so, that they have not undergone great alteration. In the Laurentian formations there are found many limestones, but it cannot be demonstrated that they are produced from shells, or that they contained animal life, except *eozoön Canadense* be regarded as such. See EOZOÖN. These Laurentian or archæan rocks extend over the whole globe, and either they or the rocks of which they are the metamorphosed products composed the floor of the first ocean, and constituted the foundation upon which the first life was developed. The action of water and heat caused sedimentary deposits, and when the heat was sufficiently reduced life began, and became, in some degree, an element in the process. The principal areas of archæan rocks in North America are in British America, extending in broad lines from the region of lake Superior north-west to Alaska, on one hand; and on the other, to Labrador, having the form of the letter V, inclosing Hudson's bay within the triangle. There is a much smaller region called the Adirondack, lying in the counties of Essex, Clinton, Franklin, St. Lawrence, Hamilton, and Warren, N. Y., and also an Appalachian line of Laurentian rock, including the highland ridge of Dutchess county, N. Y., and, passing through New Jersey, Maryland, and Virginia, forming the Blue ridge, and a long rocky mountain series, embracing the Wind River mountains, the Laramie range, and other summit ridges of the Rocky mountains. The rocks include granite (q.v.), gneiss (q.v.), mica schist (q.v.), mica slate (q.v.), talc (q.v.), chlorite (q.v.), syenite (q.v.), hornblende (q.v.), serpentine (q.v.), chrysolite (q.v.), apatite (q.v.), and plumbago (q.v.), which is supposed to have a vegetable, but may have had an entire mineral or inorganic origin. The archæan rocks are rich in iron-bearing minerals, as for example in the Missouri Iron mountain, containing magnetite, Fe_3O_4, and hematite, Fe_2O_3. Some of the beds are several hundred feet thick. Crystalline limestone, often occurring as statuary marble, is one of the rocks found in the archæan formations. See MARBLE. Nearly all geologic ages have produced metamorphic from sedimentary rocks, such as sandstone (q.v.), shale (q.v.), argillite, or clay slate (see ARGILLACEOUS ROCKS), massive limestones (see LIMESTONE), magnesian limestone (see DOLOMITE), hydraulic limestone (see CEMENTS), and occasionally volcanic products, as tufa (q.v.). Sandstones have passed into quartzite, quartz rock, or granular quartz. See Quartz Rock in QUARTZ, *ante*.

METAMOR'PHOSIS (Gr. change of form) denoted, in the mythology of the ancients, those transformations of human beings into beasts, stones, trees, and even into fire, water, etc., in fables of which that mythology abounded. The origin and significance of such fables it is often impossible to determine. Some of them probably originated in observation of the wonderful transformations of nature; some in a misapprehension of the metaphors employed by the older poets; and some, perhaps, in mere superstition and love of the marvelous. The wild imagination of the orientals filled their mythologies with metamorphoses in the greatest number; and the classic mythology approaches to them in this respect. They were the theme of some of the poets and other Greek authors of the Alexandrine period, and of Ovid among the Latin classics. The mediæval

literature of Europe, especially of Germany, in its fairy tales and other forms of folk-lore, is also wonderfully rich in metamorphoses.

METAMORPHOSIS OF **ANIMALS.** This term is applied to changes which certain animals undergo after their escape from the envelope of the egg, and which are of such a nature as essentially to alter the general form or the mode of life of the individual.

The most remarkable metamorphoses occur in the batrachians, crustaceans, insects, and tape-worms, and are briefly noticed in the articles on those classes of animals. For an excellent general account of the metamorphoses of animals the reader is referred to a series of articles by De Quatrefages in the *Revue des Deux Mondes* for 1853.

METAMORPHOSIS OF ANIMALS (*ante*). In the development of an animal the embryo may pass through all the stages of growth to a condition which differs from the adult only in size, proportion, and sexual characteristics, having thereafter only to be nourished to attain full development; or it may leave the egg in a condition remote from that of the adult, and then pass through a greater or less number of stages of distinctly marked characteristics. Each one of these stages is a metamorphosis, and collectively constitute the metamorphoses through which the animal passes. "When metamorphosis occurs the larva may live under conditions totally different from those under which the adult passes its existence. Thus the larva of an animal which is fixed in the adult state may be provided with largely developed locomotive organs; while that of an adult which feeds by suction may be provided with powerful apparatus for the seizure and manducation of vegetable and animal prey. The larva of a free adult may be parasitic, or that of a parasitic adult free and actively locomotive. Moreover, the whole course of development may take place outside the body of the parent, or more or less extensively within it; whence the distinction of *oviparous*, *ovoviviparous*, and *viviparous* animals" (Huxley). An example of that kind of metamorphosis in which non-parasitic larvæ become parasitic pupæ and adults is seen in the *rhizocephala*. See INVERTEBRATE ANIMALS, subkingdom annulosa, class crustacea, order rhizocephala. For further information see various parts of the article on INVERTEBRATE ANIMALS, and also INSECTS, *ante*, and LOCUSTS, and GRASSHOPPERS.

METAMORPHOSIS OF **ORGANS**, in botany, a subject of so much importance that it has been exalted to the rank of a distinct branch of botanical science, under the name of *morphology* or *vegetable morphology*. Attention to it is essential to a philosophical study of botany; yet it may almost be said that nothing was known either of its facts or its laws till the poet Goethe proclaimed them to the world in his treatise entitled *Die Metamorphose der Pflanzen* in 1790. Linnæus had, indeed, called attention to the development of organs, and the changes which they undergo, and had made this the subject of a *thesis* entitled *Prolepsis Plantarum* in 1760; but, in a manner very unusual with him, he mixed up with his observations and philosophical speculations certain fanciful suppositions, the falsehood of which soon becoming apparent caused all the rest to be neglected. Wolff afterwards extricated the true from the fanciful in the views of Linnæus, and gave them greater completeness; but he introduced the subject only incidentally in a paper on comparative anatomy, which failed to attract the attention of botanists, and probably had never been seen by Goethe, whose discovery, apparently altogether original, is one of the finest instances on record of acute observation combined with philosophical generalization.

The metamorphosis of organs is noticed in the articles on particular organs. It is only necessary here to make a very general statement of its facts and laws. A plant is composed of the *axis* and its *appendages;* the axis appearing above ground as the stem and branches, below ground as the root; the appendages being entirely above ground, and essentially *leaves;* all organs which are not formed of the axis being modified leaves. The proof of this consists very much in the gradual transition of one organ into another, manifest in some plants, although not in others; as of leaves into bracts, one of the most frequently gradual transitions; of leaves into sepals, as seen in the leaf-like sepals of many roses; of sepals into petals, as seen in the petal-like sepals of lilies, crocuses, etc.; of petals into stamens, as seen in water-lilies; and even of stamens into pistils, often exemplified in the common house-leek. The proof is confirmed and completed by observation of the monstrosities which occur in plants, particularly in the frequent return of some part of the flower to its original type, the leaf, and in the conversion of one part of the flower into another, which is often the result of cultivation, and is particularly illustrated in *double* flowers, the increase of the number of petals being the result of the conversion of stamens into petals.

A flower-bud being a modified leaf-bud (see BUD), and a flower therefore the development of a modified leaf-bud, the parts of a flower correspond in their arrangement with the leaves on a branch. But peculiar laws govern the development of organs in each species of plant. Thus the leaves in one are opposite; in another, alternate; in another, whorled; all depending on the law which governs the growth of the axis in relation to the development of leaves, which is very constant in each species; and in like manner the parts of the flower are developed in whorls around an abbreviated terminal portion of the axis, the energies of the plant being here directed to the reproduction of the species, and not to the increase or growth of the individual. The fruit itself, being formed from the pistil, is to be regarded as formed of modified leaves. Goethe truly

says: "The pod is a leaf which is folded up and grown together at its edges, and the capsule consists of several leaves grown together; and the compound fruit is composed of several leaves united round a common center, their sides being opened so as to form a communication between them, and their edges adhering together."

The metamorphosis of organs has been investigated with great diligence and success, and beautifully elucidated by Miquel, Lindley, Schleiden, and other botanists.

METAMORPHOSIS OF TISSUE. See TISSUE.

METAPHOR (Gr. *metaphora*, a transference), a figure of speech by means of which one thing is put for another which it only resembles. Thus, the Psalmist speaks of God's law as being "a light to his feet and a lamp to his path." The metaphor is therefore a kind of comparison in which the speaker or writer, casting aside the circumlocution of the ordinary similitude, seeks to attain his end at once by boldly identifying his illustration with the thing illustrated. It is thus of necessity, when well conceived and expressed, graphic and striking in the highest degree, and has been a favorite figure with poets and orators, and the makers of proverbs, in all ages. Even in ordinary language the meanings of words are in great part metaphors, as when we speak of an *acute* intellect, or a *bold* promontory.

METAPHYSICS, a word of uncertain origin, but first applied to a certain group of the philosophical dissertations of Aristotle (see ARISTOTLE). As since employed, it has had various significations, and more especially two—a larger and a more confined. In the more confined sense it is allied to the problems of the Aristotelian treatise, and is concerned with the ultimate foundations of our knowledge of existing things. What is the nature of our knowledge of the external world, seeing that mind cannot properly know what is not in contact with itself? has been asked by philosophers, and answered in various ways; and this is the great question of metaphysics (see PERCEPTION, COMMON SENSE). The name "Ontology" has been applied to the same inquiries into our cognizance of existences out of ourselves. But as the solution of this difficult question was found to involve an investigation into the nature of the human mind, it became allied with the science whose object it is to describe fully and systematically the laws and properties of our mental constitution—a science called by the various names of psychology, mental philosophy, moral philosophy; and hence metaphysics came to be an additional name for this more comprehensive department. The word is employed at the present day by writers of repute in both meanings. Thus, Ferrier's *Institutes of Metaphysic* is occupied solely with the questions connected with knowledge, or the nature of our perception of an external world; his explanatory title is, *The Theory of Knowing and Being*. On the other hand, Mansel's metaphysics is divided into two parts—PSYCHOLOGY, or the science of the facts of consciousness, which expresses the science of mind generally; and ONTOLOGY, or the science of the same facts considered in their relation to realities existing without the mind—that is, the problem of perception, or metaphysics in the narrower sense.

METAPONTUM, or METAPONTIUM, an ancient city of Magna Græcia, Italy; 24 m. from Tarentum, and 14 from Heraclea. It was founded by an emigrating tribe of the Achæans as early as 700 B.C., and perhaps before that time. In 415 B.C. we find the inhabitants allies of the Athenians in their invasion of Sicily, and for some time previous the town had evidently been in a condition of constantly increasing prosperity. Here the philosopher Pythagoras spent his last days, and in classical times his tomb was still to be seen. In the wars waged against Rome by Pyrrhus and Hannibal, the Metapontines were hostile to the imperial city. At the end of the war of Pyrrhus they were subjugated completely by the Romans, and in 212 B.C. succeeded in throwing off the yoke by admitting the Carthaginians. When the latter retreated from Italy the Metapontines, fearing the vengeance of Rome, fled with Hannibal; and the city was deserted, and soon fell into ruins, some of which may still be seen.

METASTASIO (originally **TRAPASSI**), PIETRO, one of Italy's most admired poets, was b. at Rome in 1698, of humble parents, and gave early evidence of his genius by his boyish improvisations. Metastasio having attracted the casual notice of Gravina, a famous jurisconsult of the day, the latter undertook the entire education and career of the youth, whose paternal name of Trapassi became thenceforward Grecized into Metastasio, both words being identical in signification. The young poet speedily advanced in classical and general knowledge; and to his patron's enthusiastic devotion to the Greek drama may doubtless be traced much of the after-bent of Metastasio's own poetical tastes. By the early death of Gravina, Metastasio was placed in possession of considerable property. In 1724 he published one of his most celebrated dramas, *La Didone*, which, with *Il Catone* and *Il Siroe*, conferred on the poet a European name. In 1730 Metastasio accepted the post of poet-laureate to the imperial court of Vienna. During his sojourn in Vienna, Metastasio composed his *Giuseppe Riconoscinto*, *Il Demofonte*, and the *Olimpiade*. He died at Vienna in 1782. Metastasio was distinguished for the generosity, integrity, and candor of his nature, the sincerity of his friendships, and the disinterested warmth of his sentiments. His works are innumerable, embracing 63 dramas, 48 cantatas, besides a vast number of elegies, canzonette, sonnets, and translations. They enjoy unexampled popularity among all grades of his countrymen; in their pure classical subjects and forms

the educated student finds instruction and delight; while their facile musical grace and verbal simplicity adapt them to the popular appreciation of the artless beauties of poetry. The best editions of Metastasio are those of Turin (1757, 14 vols.); Paris (1755, 12 vols.); Paris (1780, 12 vols., large 8vo); Genoa (1802, 6 thick vols.); Mantua (1816–20, 20 vols.).

METAS'TASIS, a change in the seat of a disease from one part of the body to another. Rheumatism and gout are examples. Muscular rheumatism is more or less movable, changing from one set of muscles to another. Arthritic rheumatism is more liable to change persistently from one joint to another, or it may pass to an analogous tissue in another kind of organ, as to the serous membranes of the heart, or pericardium, constituting cardiac rheumatism, a dangerous affection. Gout is well known for its flights from one point to another. Inflammation of the parotid gland, or mumps (q.v.) is also a metastatic affection. The causes of metastasis are rather obscure, but they are undoubtedly intimately connected with the nervous system, whose terminal fibers, ending as they do in the cellular elements of the tissues, influence, in a great measure, their pathological as well as physiological action.

METAYER (Ital. *metà*, Fr. *moitié*, half), in French, is the cultivator of a *metairie*, or farm, the tenant of which gives the landlord a portion of the produce as his rent. In some of the older French dictionaries, such as that of Trevoux, the word is said to apply to any kind of farmer, but in the oldest dictionary of French and English, Cotgrave's, the word is thus interpreted: "Properly one that takes ground, to the halves, or binds himself by contract to answer unto him of whom he holds them half, or a great part of the profits thereof." The term has lately got a meaning in political economy on account of some eminent writers having raised the question whether this arrangement between landlord and tenant is not so much more advantageous than any other, both to the parties immediately concerned and to the public at large, that it ought to be specially encouraged. Sismondi appears to have been the first to open this wide view of the influence of the practice, and he has given a chapter to its consideration in his Political Economy (b. iii. chap. 5). He says what cannot be denied, that such an arrangement was a great improvement on mere serfdom, which gave the cultivator no interest in the produce of his industry. But in giving the reasons for his admiration of the system as one which provides in the general case for the wants of the peasant while relieving him of all anxiety about markets and prices, he admits that a metayer peasantry never advance beyond the humble, happy, and contented lot which immediately falls to them. It is a system, therefore, inconsistent with the application of large capital to cultivation, and consequently with the extraction of the highest value which the soil can yield. A tenant will hesitate to lay £50 worth of guano on his fields if half the additional crop it will bring goes to his landlord. To those who maintain that the moral effect of the system is beneficial, this will be no argument against it, but to the political economist it is an argument against the practicability of the system in a rich money-making agricultural country. Where there is an enterprising peasantry without capital it is a valuable resource; a great portion of the valuable agricultural districts of Scotland were thus brought into cultivation by improvers whose rent was a portion of the crop. But while these very districts in a great measure owe their present prosperity and the existence of a set of capitalist-farmers to such a system of cultivation pursued with more energy than M. Sismondi considers natural to it, there is no doubt that the substitution of such an arrangement for money-rent would now be a very serious waste.

METCALFE, a co. in s. Kentucky, drained by the south fork of Green river, which rises within its limits; 370 sq.m.; pop. '80, 9,423—9,414 of American birth, 1036 colored. Its surface is varied, and largely covered with timber. Its soil is fertile, producing large quantities of tobacco, and suited to the production of wool, sweet-potatoes, the products of the dairy, flax, maple sugar, sorghum, honey, fruit, and every kind of grain. Stock-raising receives much attention, and its grist-mills are run by steam. Seat of justice, Edmonton.

METCALFE, FREDERICK, b. England, 1817; a distinguished scholar and educator, having pursued the regular course of study at the university of Cambridge, graduated in 1838, and was elected fellow of Lincoln college, Oxford. In 1848 he accepted the position of principal of the Brighton college, an institution founded in 1847 for the sons of noblemen. In 1844 he published a translation of prof. A. Becker's *Gallus*, or *Roman Scenes of the Times of Augustus*, with notes and exercises, considered of great historical value; 2d edition, 1853. In 1845 a translation of Becker's *Charicles*, a tale illustrative of private life among the ancient Greeks, with notes and exercises. He was the author of *History of German Literature*, based on the German work of Vilmar, 1858; other works are *The Oxonian in Norway*, or notes of excursions in that country, 1856, *The Oxonian in Thelemarker*, 1858, *The Oxonian in Iceland*, 1861, and an adaptation, for use in schools, of Whittaker's edition of Dr. Charles Anthon's *Virgil*, 1846.

METELLUS, the name of a Roman family of the plebeian gens Cæcilia, which rose to be one of the first families of the Roman nobility.—One of the most distinguished members of the family was QUINTUS CÆCILIUS METELLUS MACEDONICUS, who received his surname from his victory over Andriscus, an aspirant to the throne of Macedonia (148 B.C.). His life was considered by ancient writers an example of the greatest felicity.

He died 115 B.C.—Another was QUINTUS CÆCILIUS METELLUS NUMIDICUS, who twice defeated Jugurtha in Numidia (109 B.C.), and was celebrated for his integrity of character, but was superseded in his command by Marius. His son, QUINTUS CÆCILIUS METELLUS, surnamed *Pius*, joined Sulla in 83 B.C., but sought to moderate the severity of his proscriptions. He, too, bore a distinguished character for virtue.—QUINTUS CÆCILIUS METELLUS CRETICUS conquered Crete, and reduced it to a Roman province (67 B.C.).—QUINTUS CÆCILIUS METELLUS PIUS SCIPIO, sometimes called QUINTUS SCIPIO, and sometimes SCIPIO METELLUS, was a son of Publius Cornelius Scipio, who was adopted by one of the Metelli, and became the father-in-law of Pompey, and his zealous partisan. He commanded under him at Pharsalus, maintained war on his behalf for some time in Africa; and after the battle of Thapsus (46 B.C.), died by his own hand.

METEMPSYCHO'SIS. See TRANSMIGRATION OF SOULS.

METEOROL'OGY (Gr. *metéōra*, meteors, or atmospheric phenomena) was originally applied to the consideration of all appearances in the sky, both astronomical and atmospherical; but the term is now confined to that department of natural philosophy which treats of the phenomena of the atmosphere as regards weather and climate. The leading points of this wide subject will be found under such heads as AËROLITES, ATMOSPHERE, BAROMETER, BOILING, CLOUDS, DEW, ELECTRICITY, EVAPORATION, FOG, HAILSTONES, HALOS, HOAR-FROST, LIGHTNING, MAGNETISM, RAIN, SNOW, STORMS, etc. We confine ourselves here to a historical sketch of the science.

Owing to the complexity of the phenomena, meteorology is the most difficult and involved of the sciences, and seems, indeed, at first sight, almost incapable of being reduced to a science at all. On this account, the only procedure admissible in the first place is long and patient observation, and a faithful recording of facts.

From the nature of the subjects which make up the science, it may be inferred that they occupied men's minds from a remote antiquity. The splendid and ever-varying panorama of the sky, and the changes of temperature through the days and the seasons, with all the other elements constituting the weather, and thus powerfully affecting the necessities and comfort of man, are of a nature well fitted to arrest his attention. From the time spent in the open air in the early ages, and from the imperfect protection afforded against the inclemency of the seasons, those appearances which experience proved to precede a change of weather would be eagerly recorded and handed down. In this way, many most valuable facts were ascertained and passed current from hand to hand; and, perhaps, there is no science of which more of the leading facts and inferences have been from so early a period incorporated into popular language.

Aristotle was the first who collected, in his work *On Meteors*, the current prognostics of the weather. Some of these were derived from the Egyptians, who had studied the science as a branch of astronomy, while a considerable number were the result of his own observation, and bear the mark of his singularly acute and reflective mind. The next writer who took up the subject was Theophrastus, one of Aristotle's pupils, who classified the opinions commonly received regarding the weather under four heads, viz., the prognostics of rain, of wind, of storm, and of fine weather. The subject was discussed purely in its popular and practical bearings, and no attempt was made to explain phenomena whose occurrence appeared so irregular and capricious. Cicero, Virgil, and a few other writers also wrote on the subject without making any substantial accessions to our knowledge; indeed, the treatise of Theophrastus contains nearly all that was known down to comparatively recent times. Partial explanations were attempted by Aristotle and Lucretius, but as they wanted the elements necessary for such an inquiry, being all but totally ignorant of every department of physical science, their explanations were necessarily vague, and often ridiculous and absurd.

In this dormant condition meteorology remained for ages, and no progress was made till proper instruments were invented for making real observations with regard to the temperature, the pressure, the humidity, and the electricity of the air. The discovery of the weight or pressure of the atmosphere made by Torricelli in 1643 was undoubtedly the first step in the progress of meteorology to the rank of a science. This memorable discovery disclosed what was passing in the more elevated regions of the atmosphere, and thus the elevations and depressions of the barometric column largely extended our knowledge of this subtle element. See BAROMETER.

The invention and gradual perfecting of the thermometer (q.v.) in the same century, formed another capital step; as without it nothing could be known beyond vague impressions regarding temperature, the most important of all the elements of climate. This great invention soon bore excellent fruit. Fahrenheit constructed small and portable thermometers, which, being carried by medical men and travelers over every part of the world, furnished observations of the most valuable description—the comparative temperature of different countries became known, and the exaggerated accounts of travelers with regard to extreme heat and cold were reduced to their proper meaning. Scarcely less important was the introduction of the hygrometer (q.v.), first systematically used by De Saussure (died 1799), and afterwards improved by Dalton, Daniell, and August. From the period of the invention of these instruments, the number of meteorological observers greatly increased, and a large body of well-authenticated facts of the utmost value was collected. The climates of particular parts of the earth were determined, and

the science made great and rapid advances by the investigations undertaken by distinguished philosophers into the laws which regulate the changes of the atmospheric phenomena.

The theory of the trade-winds was first propounded by George Hadley in the *Philosophical Transactions* for 1735; and it may be mentioned as a remarkable fact that for about half a century it remained quite unnoticed, when it was independently arrived at by Dalton, and published in his essays.

The publication of Dalton's Meteorological Essays, in 1793, marks an epoch in meteorology. It is the first instance of the principles of philosophy being brought to bear on the explanation of the intricate phenomena of the atmosphere. The idea that vapor is an independent elastic fluid, and that all elastic fluids, whether alone or mixed, exist independently; the great principles of motion of the atmosphere; the theory of winds, their effect on the barometer, and their relation to the temperature and rain; observations on the height of clouds, on thunder, and on meteors; and the relations of magnetism and the aurora borealis, are some of the important questions discussed in these remarkable essays, with an acuteness, a fullness, and a breadth of view that leave little to be desired.

One of the most interesting and truthful subjects of inquiry that engaged the attention of meteorologists was *dew*. The observations on this subject were first collected and reduced to a perfect theory by Dr. Wells. See DEW.

In 1823 Daniell published his *Meteorological Essays and Observations*, which, while adding largely to our knowledge in almost every department of the subject, are chiefly valuable as bearing on the hygrometry of the atmosphere. Though the practical advantages which he anticipated would flow from it have not been realized, yet this difficult and still obscure department of meteorology stands indebted to him more than to any other philosopher. The law of the diffusion of vapor through the air, its influence on the barometric pressure, and its relations to the other constituents of the atmosphere are among the least satisfactorily determined questions in meteorology. Since this element is so important as an indicator of storms and other changes of the weather, and since so much remains still to be achieved, it is to be hoped that it will soon be more thoroughly investigated. A most important addition has lately been made to our knowledge of the vapor of the atmosphere by professor Tyndall, in his experiments on radiant heat, especially as regards the gases. The vapor of water is there shown to exert extraordinary energy as a radiant and absorbent of heat; and hence the vapor dissolved in the air acts the part of a covering or protection to the earth. As it is, to some extent, impervious to solar and terrestrial radiation, it follows that if the air were quite drained of its moisture, the extremes of heat and cold would be so intense and insufferable that all life would instantly perish, there being no screen shielding the earth from the scorching glare of the sun by day and from the equally scorching and blighting effects of its own radiation by night. It is to be expected that this great discovery will soon throw light on many questions of meteorology.

Electrical observations have been, of all meteorological observations, perhaps the least productive, partly owing to their scantiness, from the expense and trouble attending them, and partly, no doubt, to the free and bad use made of the name of electricity by crude theorists in explaining phenomena of which it would have been wiser to have confessed their ignorance. But the brilliant discoveries which have recently been made on the mutual relations of heat, motion, electricity, magnetism, and the other forces of matter, lead us to indulge the hope that the application of these results to meteorology will be attended with discoveries equally brilliant and important.

Humboldt's treatise on *Isothermal Lines* (1817) constitutes a notable epoch in experimental meteorology. Dové has since continued the investigation, and in his splendid work, *On the Distribution of Heat on the Surface of the Globe*, has given charts of the world, showing the temperature for each month and for the year, and also charts of abnormal temperatures. It is scarcely possible to overestimate the value of this work, for though, to a considerable extent, the lines are hypothetical, there can be no doubt that a close approximation to the march of mean temperature and its distribution over the earth through the year has been arrived at. The idea has been carried out with greater fullness of detail by the United States government in the beautiful and elaborate series of charts of temperature and rainfall given in the *Army Meteorological Register* for 1855. In these charts the temperature and rainfall in the different seasons for every part of the United States, deduced from accurate observations, may be seen at a glance. Buchan has published isothermals for the British isles, Mohn for Norway, and Blandford for Hindustan; and isothermals for the sea have been published by the admiralty.

The establishment of meteorological societies during the last twenty years must also be commemorated as contributing in a high degree to the solid advancement of the science which, more than any other, must depend on extensive and carefully conducted observation. In this respect, the United States stand pre-eminent, the observers there numbering nearly 800. Great Britain is also well represented in the English and Scottish societies, which together number above 200 observers. In France, Germany, Russia, etc., the science is also being widely cultivated. Owing to the disastrous flooding of the Rhone, an inquiry has been carried on for several years, having for its object the determination of those causes which affect the rainfall in the basins of the Rhone and Saône. Observers in Germany and Great Britain have been secured to co-operate with

the French observers, and under the management of a commission it may be expected that important conclusions respecting the rainfall and the progress of storms will be arrived at, and means devised to avert the calamity of these great floods by timely warning being given of their approach.

A special object of meteorological societies is to ascertain the degrees of heat, cold, and moisture in various localities, and the usual periods of their occurrence, together with their effects on the health of the people and upon the different agricultural productions; and by searching into the laws by which the growth of such products is regulated the agriculturists may be enabled to judge with some degree of certainty whether any given article can be profitably cultivated.

But perhaps none of the arts have benefited to so large an extent by the labors of meteorologists, as navigation. The knowledge thus acquired of the prevailing winds over the different parts of the earth during the different seasons of the year—and the regions of storms and calms—and the laws of storms, have both saved innumerable lives, and by pointing out the most expeditious routes to be followed, shortened voyages to a remarkable degree. In connection with this, the name of Captain Maury (q. v.) deserves special commendation for the signal service he has rendered to navigation.

Another fruit of the multiplication of meteorological stations is the prediction of storms and "forecasts" of the weather, which have been carried on in the United States, and commenced with ability and success by Admiral Fitzroy in England. These "forecasts" are based on telegrams which are received every morning from above forty selected stations in Great Britain and Ireland, and on the continent, from Haparanda as far south as Lisbon. These telegrams give the exact state of the barometer, thermometer, hygrometer, and rain-gauge, with the direction and force of the wind, and appearance of the sky, at each of these forty stations at eight in the morning. In the event of there being any storm or other atmospheric disturbance at one or more of these places, a full and accurate description of it is thus conveyed to London; and it is thence the duty of the officials there to consider the direction in which the storm is moving, so as to enable them to give warning of its approach by special signals. But in addition to warnings of storms, Fitzroy also issued daily "forecasts" of the weather likely to occur in the different districts of Great Britain for the following two days, and which were in like manner founded on the state of the atmosphere at distant points, keeping in view the atmospheric currents known generally to prevail at that particular time of the year. As the cost of this system was about £2000 annually, a severe test was applied, at the instance of the Treasury, from July 1861 to June 1862, for the purpose of ascertaining whether the expenditure was justified by the success attending it. During the first six months, 413 signals were hoisted, and in 214 cases a storm occurred where a warning was given. It must not be inferred that in the remaining 199 cases there was no storm anywhere; all that was meant was, that no storm occurred at the places where the signal was given; but a storm may have occurred, and probably did occur, in some other part of the country. Now that the system has been longer in use, the signals are given from a better knowledge of the movements of the atmosphere, so that if the test were again applied, the number of failures would be found to be much fewer. Since the barometric depression is in almost all cases spread over a wider area than the storm which accompanies it, and since the storm occasionally passes into the upper regions of the atmosphere, so as to be less felt on the earth's surface at that place, it is obvious that a considerable time must yet elapse before a sufficiently intimate knowledge of the movements of the air be acquired in order to indicate with certainty the particular places where the storm will break out, and where it will not. The problem to be practically worked out is this: Given the telegrams from the stations showing the exact meteorological conditions prevailing over the included area, with indications of a storm approaching in a certain direction, to determine, not the probable area over which the tempest will sweep, but the precise localities which will altogether escape, the places where the storm will rage, and the places where it will not touch the earth, but pass innocuously into the upper regions of the atmosphere; its continuance, its violence, and the particular directions from which the wind will blow at the places visited by the storm while it lasts. Considerable progress has already been made towards the solution of this difficult problem; and if a complete solution be impossible, such an approximation to a solution will doubtless be arrived at as will render it foolhardy to disregard the warnings given.

But these predictions only extend to a few days. Does the present state of the science afford any grounds to hope that prediction for longer periods will yet be attained? Weather-registers extending over long periods give no countenance whatever to the notion, that there are regularly recurring cycles of weather on which prediction may be based. Further, the manner in which good and bad seasons occur in different places with respect to each other, shows clearly that they have little direct immediate dependence on any of the heavenly bodies, but that they depend directly on terrestrial causes. Thus, while the summer of 1861 was almost unprecedentedly wet and cold in Scotland, the same summer was hot and dry to a degree equally unprecedented on the continent of Europe, and particularly in Italy; and such examples may be multiplied almost *ad infinitum*

The assumption that the equatorial and polar currents of wind at any locality may

ultimately balance each other, would appear, from recent observation, to give some ground for prediction extending over considerable intervals. Thus, a wet summer was predicted for Britain in 1862, from the circumstance of a most unusual prevalence of e. winds in the spring of that year. An almost incessant continuance of s.w. winds followed, which discharged themselves in deluges of rain, clouded skies, and a consequent low temperature. As these s.w. winds prevailed till the spring of 1863, less s.w. wind was looked for during the summer, which was thus expected to be fine and warm—a prediction which was realized. This prediction holds in about three cases out of four.

The following are a few standard works on Meteorology, in addition to those already referred to: L. F. Kaemtz's *Meteorology*, translated from the German (Lond. 1845); Dr. Ernst Erhard Schmid's *Lehrbuch der Meteorologie* (Leipz. 1860); Professor Espy's *Fourth Report on Meteorology* (Washington, 1857); Drew's *Meteorology*, a useful handbook (Lond. 2d ed. 1860); Herschel's *Meteorology* (1861); D. P. Thomson's *Introduction to Meteorology* (1849); Buchan's *Handy Book of Meteorology* (1868); Loomis' *Treatise on Meteorology* (1868).

METEOROLOGY (*ante*). The advancement in meteorological science in recent years has been mainly in the direction of the application of the laws of storms to practical use, in foretelling perturbations in the interest of commerce and navigation. In this direction great progress has been made, as to which, see SIGNAL SERVICE OF THE UNITED STATES. From the accumulation of statistics and history in this department, the following information concerning the government and private machinery for meteorological observation in different countries, is compiled: The first international meteorological congress occurred at Vienna, in September, 1873, when eighteen governments were represented by delegates officially appointed. This congress had been preceded by the Brussels maritime conference in 1853, the conference at Leipsic in 1872, and the meeting at Bordeaux in the latter year. The object of these meetings was to establish an international and reciprocal meteorological system for the benefit of the countries participating, and indeed of the civilized world. This object was so far effected that a strong interest was awakened in the subject on the part of the different governments, and a permanent committee was appointed which holds annual meetings. Among those—and chief among them—who have labored unselfishly to awaken interest in the study of the laws of storms should be ever remembered the names of Redfield, Espy, Fitzroy, Reid, and Maury; besides Humboldt, Dove, Ritter, Sabine, Kämtz, and Herschel, who preceded them in the same field. Through the efforts of some of these meteorologists the information gained by the experience of navigators has been collated and analyzed, and a very complete knowledge of ocean meteorology has been obtained; while the storms of the Indian ocean and the law of cyclones have been studied by Meldrum, with the assistance of the Mauritius meteorological society, to the great advantage of the world's information on the science. The first effort in the direction of making regular meteorological observations in the United States was made in 1818 at military posts, under the direction of surgeon-general Lovell, and as these are still continued, they form the oldest unbroken national series of the kind in existence. Certain of the states afterwards entertained the idea, and New York from 1825–1863, Pennsylvania 1836–1842, Ohio in 1842, and Illinois in 1856, formed organizations for the same purpose, but which have all been discontinued. Besides the information obtained from these sources, there has been much service performed in a desultory way by the Franklin institute, Smithsonian institution, state boards of health, agricultural and geological societies, and other organizations, as well as by special expeditions. Half a century ago, James P. Espy, an enthusiast, as well as a clear-headed observer, devoted himself to the study of meteorology, and by lectures and writings sought to popularize the subject. In 1836 he wrote a memoir which gained for him the Magellanic premium awarded by the American philosophical society; and in 1841 appeared his *Philosophy of Storms*, which publication completely revolutionized the sum of scientific opinion on the subject. The following year he was appointed meteorologist in the surgeon-general's office of the war department, and having already begun the practice of weather-mapping, he continued it daily. His first published report in 1843 is acknowledged to have been "by far the most important contribution to our knowledge of storms that had then been made by any government in the world." This was in 1843; and on Mr. Espy being transferred to the navy department, he published two other reports, dated 1849 and 1851 respectively. His fourth report was made to the U. S. senate in 1854. Mr. Espy died in 1857, at the age of 72, having devoted forty years of his life to meteorological study and investigation. Thus much is here given concerning this remarkable man, because of the influence which he exerted, and which doubtless gave the timely impetus that resulted in placing the United States in the front rank among those nations that have given its due importance to the study of meteorology. This study, with its accompanying record of observation, is prosecuted in the United States at the following points, 1. The independent observatories at Cambridge, Washington, Albany, and New York Central Park. 2. The state weather services of Iowa, receiving reports from 80 observers; Missouri, with 100 observers; and Nebraska; which all publish monthly reviews and annual reports. 3. The state boards of health for Michigan, New Jersey, etc. 4. The state boards of agriculture for Illinois,

Ohio, etc. 5. The state schools of agriculture at Lansing, Mich., and Boston and Amherst, Mass. 6. The Central Pacific railroad company land office, which receives reports from 120 stations. 7. The army engineer bureau lake survey, which has maintained 8 or 10 important stations on the lakes. 8. The geological and geographical surveys of western territories (Wheeler's, Hayden's, Powell's, etc.), and the U. S. coast survey. 9. The hydrographic office of the navy department, which maintains an hourly series of observations on every vessel in commission, and at all naval stations, and publishes important charts relating to ocean meteorology. 10. The army surgeon-general's office, the Smithsonian Institution, and the agricultural department. Of these three the first continues its observations and the second its publications, although most of the data are transferred to the army signal office. 11. The army signal office, division of reports and telegrams for the benefit of commerce and agriculture. This last-named organization, whose meteorological work began by order of congress in February, 1870, far exceeds all other similar organizations in the world. It maintains 166 regular, 28 sunset, 30 river, and about 10 temporary West India stations. It also receives reports from 95 army-post surgeons, 300 voluntary civilian or Smithsonian observers, 120 railroad employés (mostly in California), about 150 observers through the state organizations in Iowa, Missouri, and Kansas, about 40 vessels and stations of the navy, about 20 merchant vessels through their respective owners, and about 390 foreign stations through the central offices of their respective countries. Rainfall reports are thus obtained from about 870 stations within the United States. It publishes a tri-weekly bulletin and map, with predictions based on tri-daily telegraphic reports from 35 additional stations; displays cautionary storm-signals at about 80 coast stations; bulletins the state of the rivers and coming floods; distributes farmers' bulletins or predictions to over 6,000 post-offices; furnishes special predictions to several hundred railroad telegraph offices; and publishes a weekly weather chronicle, a monthly weather review with charts of American storms, temperature, rain, and ocean storms, and an annual report. It also prints for exchange a daily bulletin of international simultaneous observations, with daily chart of the winds, temperature, and pressure throughout the northern hemisphere. This is based on about 700 reports from land and sea contributed by all nations, and made simultaneously with those that are made at 7 h. 35 m. A.M. at Washington, or 12 h. 43 m. P.M. at Greenwich. In the prosecution of its meteorological work and in order to carry out the system of frontier defenses, and in coöperation with the life-saving service on the United States coast, the signal service also builds and maintains lines of telegraph, of which it now controls about 3,000 m. on the Atlantic coast and in the s.w. and n.w. territories. The service employs the whole time of about 15 officers and 475 men, and a portion of the time of about 150 others. The meteorological service of foreign countries is now sustained as follows (1878): West Indies.—Numerous stations are supported in these islands by the respective home governments. The U. S. signal service maintains about 10 stations during the hurricane season. The principal independent stations are at Havana, Cuba; Kingston, Jamaica; and in Barbadoes and Porto Rico. Great Britain.—The meteorological committee of the royal society have charge of the meteorological work, with office in London. There are 7 stations properly equipped, receiving telegraphic reports from 29 British stations, and publishing daily weather-maps, bulletins, storm-warnings and signals, quarterly and annual reports, etc. It receives observations from several hundred vessels at sea, and from about 80 voluntary observers on land, besides minor stations. The medical department of the army also maintains observers at the forts throughout the British colonies, some of which report to the London office. The royal engineers and ordnance survey offices also maintain several stations. The different meteorological societies of the empire publish memoirs which contain reports from different stations. Wind and current charts and pilot charts are published by the hydrographer to the admiralty, based on observations made on shipboard. France.—Observations are maintained since 1878 by the bureau centrale de météorologie, the departments of France preserving their separate organizations. The meteorological association of France has its own stations. The bureau centrale publishes daily bulletins, weather-charts and storm-warnings, and in conjunction with the association scientifique de France, issues the annual volumes of the Atlas météorologique de France. The meteorological association corresponds with about 50 observers in different parts of the world. Germany.—The headquarters of the meteorological system is in Hamburg, and maintains about 40 stations (27 telegraphic), publishes daily weather-maps and predictions, storm-warnings, and monthly weather reviews, and receives a large number of logs from German vessels. The German forest commission maintains several stations for meteorological observations. There are subordinate organizations with stations in Bavaria, Baden, Prussia, Saxony, and Würtemberg; with headquarters respectively at Munich, Carlsruhe, Berlin, Leipsic, and Stuttgart. The whole number of well-equipped stations in Germany is about 200, and slowly increasing. Russia.—Observations are made at most of the universities, and published in full independently at Dorpat, Helsingfors, Tiflis, and Moscow. The central meteorological office is at St. Petersburg, and receives reports from 130 well-equipped (50 telegraphic), 220 rainfall, and 310 thunder-storm stations, distributed throughout the Russian possessions, abstracts of which are published annually. The central office publishes a daily telegraphic bulletin, displays storm-signals, and publishes volumes of memoirs and investigations. The academy of sciences and the geographical society aid

in the advancement of the study. Italy.—Numerous independent meteorological organizations exist, the Italian alpine club publishing observations made at about 70 stations; and the observatories at Moncalieri, Turin, Pesaro, Venice, Naples, and Rome, issuing their own observations. A general Italian meteorological association was organized in 1877. Spain.—The central meteorological office is at Madrid, and receives reports from 30 home stations including Portugal (26 telegraphic), all of which are published annually. A daily telegraph bulletin is published, and storm-warnings are issued when sent from Paris or London. In the Spanish colonies, the most important stations are at Manila and Porto Rico. Portugal.—The meteorological observatory at Lisbon receives reports from 5 home and as many colonial stations, and from the vessels of the Portuguese navy. The observations made at Coimbra and Lisbon are published in full. It publishes a daily telegraphic bulletin (10 telegraphic stations), and repeats the storm-warnings sent from London and Paris. Belgium.—The royal observatory at Brussels receives reports by telegraph from 4 stations, and publishes daily weather-maps and predictions, annual volumes of its own detailed observations, and of 4 Belgic and 4 Dutch international and of 35 Belgic climatologic stations; also an *annuaire*. Austria and Hungary.—The central meteorological institution at Vienna has charge of all observations made in the empire, and receives reports from about 275 stations (26 by telegraph, daily); it publishes a daily bulletin, storm-warning signals, and annual volume of observations. In Bohemia there are about 50 rainfall stations, and a similar system is arranged for Styria. The hydrographic office has charge of marine meteorology, with a school at Trieste and observatory at Pola. There are also independent observatories at Cracow, Prague, and Vienna, which publish their own observations. The central magnetic and meteorological institution for Hungary is at Buda-Pesth, and was founded in 1870. It publishes annually reports from about 100 stations, mostly well-equipped. A summary for 32 stations in Carinthia is published monthly at Klagenfurth. Norway.—The royal meteorological institute at Christiania receives reports from 10 full stations (7 telegraphic), 10 lighthouses, and a large number of minor stations, and logs of vessels. A telegraphic daily bulletin has been published since 1861. The meteorological observatory at Christiania was founded in 1836. Sweden.—About 30 stations (9 telegraphic) and several naval vessels report to the central meteorological institute at Stockholm, which publishes a daily telegraphic bulletin and annual volumes. The Lund and Upsala observatories publish their own observations separately. Switzerland.—The central institute for Swiss meteorology has its seat at Zürich, and publishes in full the observations at about 15 stations. The total number of reporting stations is about 80. The observatories at Bern and Geneva publish their own work in detail. The central office is maintained by the Swiss association and not by the state. There are stations in Africa—in the Transvaal, at Zanzibar, Natal, and other places, besides those in the large colonies; in Algeria observations are made under the direction of the military authorities, a daily weather bulletin and chart are published, and about 20 observing stations are maintained; at Cape Colony there is a meteorological commission instituted in 1861 and reorganized in 1874. It receives reports from 30 or 40 stations: the royal observatory at Cape Town maintains an independent series of observations. Australia.—The several provincial governments maintain systems at Queensland, 5 telegraphic stations; New South Wales, 190 stations (35 telegraphic); South Australia, 110 stations (5 telegraphic); Victoria, about 40 stations (27 telegraphic). The central offices of these are at Brisbane, Sydney, Adelaide, and Melbourne; there are also individual stations at Melbourne, Windsor, and Hobart Town, which publish their own observations. Ceylon.—About 30 stations report to the surveyor-general at Colombo, and the reports are partially published. China.—Instruments for equipping about 20 stations were obtained in 1874, but we have no reports. Egypt.—The principal service is that of the lighthouse keepers, though observations are made at the observatories near Cairo and at Alexandria, and on the Suez canal. Japan.—Observations are made at the imperial observatory and at the imperial colleges of mining and engineering, and a system of records is preserved by the lighthouse keepers. Reports will be soon forthcoming also from about 20 equipped stations. New Zealand.—About 20 meteorological stations are maintained. Philippine islands.—The observatory of the Jesuit college at Manila, in Luzon, is the only station permanently occupied, and publishes annually its observations. Netherlands.—The central meteorological institute maintains 14 full and 23 minor stations (4 telegraphic), issues storm-warnings, and publishes annual volumes. There are a large number of rainfall stations. Its most important colonial station is at Batavia. Denmark.—The royal Danish meteorological institute receives reports from 12 principal (8 by telegraph) and 70 minor stations in Denmark, also 5 from Iceland and 5 from Greenland. It publishes daily bulletins, annual volumes, and a daily chart of the Atlantic ocean. Finland.—The scientific association at Helsingfors maintains 22 stations and publishes its own results. The observatory at Helsingfors is independently maintained. India.—The provinces of Bengal, the Punjab, the Northwest, Madras, etc., maintain independent systems of meteorological reports. In 1875 a general meteorological office was established in the department of revenue, agriculture, and commerce. About 300 stations report by mail to the head of this office daily, and about 50 by telegraph. It publishes daily, weekly, and monthly bulletins, and special storm-warnings. Chili.—An extensive system of observations is maintained at Santiago,

receiving regular reports from 13 or more stations. Costa Rica.—There is a central office for statistics and meteorological observations, and a station at the capital. Argentine Republic.—The meteorological office is attached to the astronomical observatory, about 30 voluntary observers reporting. There are also scattered stations in South America, at Quito, Lima, Rio Janeiro, Georgetown, Surinam, and Trinidad. Mexico.—A central office in the capital publishes a daily telegraphic bulletin from about 30 stations, and monthly summaries. Canada and Newfoundland.—The Canadian meteorological office is under the minister of the marine, who receives reports from about 20 first-class (14 by telegraph) and about 140 minor stations, distributed throughout the British possessions. It issues daily weather predictions and storm-warnings, and displays storm-signals. Turkey.—The central observatory at Constantinople receives reports from about 30 stations, publishes a daily telegraphic bulletin of 17 stations, and its own observations in full, and issues storm-warnings. Syria.—Observations are maintained at the Syrian college (Protestant mission) in Beyrout, and a more extended system is understood to have been recently organized under the British and American "Palestine Exploration" societies. Mauritius.—The meteorological association of Mauritius was established in the year 1851. It has published irregularly monthly notices, maintains a large number of rainfall stations, and gives warning of such storms as are evidently about to make themselves felt in the vicinity of the island. Beyond this there is no mention of any meteorological work progressing here.

METEORS. The whole subject of meteors was treated in the body of the work under the head of AËROLITES. The subject, however, has since occupied a great deal of attention, and there is at present a tendency on the part of astronomers and physicists to separate that class of meteors known as "shooting-stars" from the group of *meteorolites* (which includes *aëro-siderites*, or masses of meteoric iron; *siderolites*, which are conglomerates of iron and stone; and *aërolites*, which are wholly of stone), on the grounds that the most prominent appearances of the former are *periodic*, while the latter seem to occur at irregular intervals, and that the former have hitherto not been *proved* to leave any traces of their visit on the earth's surface. We are, however, hardly as yet in a position to decide as to the similarity or dissimilarity of the two classes of bodies.

Popular interest has been largely aroused respecting "shooting-stars," by reason of the brilliant display of them which took place on the night of Nov. 13, 1866. This "star-shower," the grandest that has ever been observed in Britain, was confidently predicted, from the occurrence of a similar shower at the corresponding date in 1799, 1833, and 1834; and the extremely favorable state of the atmosphere rewarded those who were on the watch with a complete view of one of nature's most magnificent displays. The shower commenced about 11½ P.M., with the appearance at brief intervals of single meteors; then they came in twos and threes, steadily and rapidly increasing in number till 1h. 13m. A.M. on Nov. 14, when no fewer than 57 appeared in one minute. From this time the intensity of the shower diminished gradually, wholly ceasing about 4 A.M. The total number of meteors which at that time came within the limits of the earth's atmosphere was estimated at about 240,000, and the number seen at each of the several observatories in Britain averaged nearly 6,000. This star-shower, like those of 1833 and 1834, seemed to proceed from the region of the heavens marked by the stars ζ and γ in the constellation Leo; and it has been shown by astronomers that this was the point towards which the earth in her orbit was moving at the time; consequently, she had either overtaken the meteoric shower, or had "met" it proceeding in a contrary direction. The meteors on that occasion presented the usual variety of color, size, and duration; the great majority were white, with a bluish or yellowish tinge; a considerable number were red and orange; and a few were blue; many surpassed the fixed stars in luster, and some were even brighter than Venus (the most brilliant planet as seen from the earth) at her maximum. Most of the meteors left trains of vivid green light 5° to 15° in length, which marked their course through the heavens, and endured for 3″ on an average, then becoming dissipated; though some of the trains were almost 40° in length, and remained in sight for several minutes. Prof. Airy observed that the direction of the meteors' flight was little influenced by the earth's attraction.

On the morning of Nov. 14, 1867, a star-shower equal in magnitude to that of 1866 was observed in France and America, but was almost wholly invisible in Britain, on account of the cloudy state of the atmosphere.

The brilliant display of 1866 gave a vigorous impulse to the astronomical investigation of shooting-stars, and it is now generally agreed that the November meteors move in an orbit round the sun, inclined at about 7° to that of the earth, and that, in all probability, this orbit forms a ring or belt of innumerable small fragments of matter, distributed with very variable density of grouping along it, thus corresponding so far to the planetoid (q.v.) group between Mars and Jupiter. It is also agreed that the motion of this meteor ring round the sun is retrograde; that the earth's orbit at that point where she is situated on Nov. 13–14 intersects this ring; and that, probably, in 1799, 1833–34, and 1866–67, it is the same group of meteors which has been observed; and the last-mentioned hypothesis has been made the foundation of a calculation of the probable orbit and periodic time of this meteor-ring. The fact that a November star-shower

generally occurs for two years in succession, and then recurs at an interval of 32 or 33 years, seems to indicate that though the earth may pass through the meteor-orbit every year, the meteors are so grouped at intervals along the ring, and their periodic time differs so much from that of the earth, that it requires 32–33 years before this accumulating difference amounts to a complete revolution of either the earth or the ring, and a repetition of the star-shower becomes possible.

Prof. Newton of Yale College, America, who entered into an elaborate investigation of the subject, concluded that the 5 possible periodic times (the earth's being taken as unity) of the meteor-ring were $2 \pm \frac{1}{33.25}$, $1 \pm \frac{1}{33.25}$, and $\frac{1}{33.25}$, and that of these the fourth, $1 - \frac{1}{33.25}$, or 354.62 days, is the actual period of its revolution round the sun, and that, consequently, it has described 34 revolutions while the earth has described 33, the cycle of 34 meteor revolutions differing from 33 years by only 3.17 days; and in accordance with this estimate, he calculated its orbit and the approximate extent (seeing the meteor shower generally occurs in two successive years) of the meteor-group which produces the November showers. His conclusions have, however, been vigorously opposed by other eminent astronomers, such as Prof. Adams (q.v.) and Mr. Alexander Herschel, both of whom hold that the first four of the possible periods given by Prof. Newton are *impossible*, and that the last, $\frac{1}{33.25}$ (i.e., that the meteor-ring makes $\frac{1}{33.25}$ of a solar revolution in a year, and one complete revolution round the sun in 33.25 years), is the correct estimate. If this view be correct, the meteor-group must be so much extended along its ring or orbit as to take more than a year to cross the earth's orbit, and a long time must necessarily elapse before a fair estimate of its extent can be obtained. A periodic time of $33\frac{1}{4}$ years, and an orbit which at the same time approaches so near the sun as to intersect that of the earth, indicate a path of great ellipticity, akin to those of the comets; and the idea of the cometary nature of these meteors derives support from two remarkable facts, the one discovered by Schiaparelli of Milan, that this assumed orbit coincides very nearly with that of the great comet of 1862 (Prof. Adams connects this comet with the August meteors), and the other by C. F. W. Peters of Altona, that it coincides with that of Tempel's comet.

Mr. Alexander Herschel also maintains that the meteors are of recent origin, probably fragments from some of the great luminous bodies, and that though at present assembled in a comparatively dense group, the difference of their relative velocities will have the effect of gradually distributing them all over the meteoric ring, when a November shower will occur every year. Mr. Herschel also carefully observed 20 meteors with the view of calculating their weight, from the rate of their motion and the amount of heat (as shown by their brightness) evolved in the destruction of their velocity, by the resistance of the atmosphere, and found their weight to vary from 30 gr. to $7\frac{1}{2}$ lbs.

The cause of the luminosity of meteors was long a point in dispute, the two chief suppositions being, that the resistance of the atmosphere to a body dashing through it at about 30 miles per second, generated so much heat as to produce ignition; while the other was the action of terrestrial magnetism. The point most strongly urged against the first supposition, by the supporters of the second, was, that the height at which meteors were occasionally seen rendered any action of the atmosphere impossible; but as this objection was founded on the purely hypothetical opinion that the atmosphere did not extend more than about 50 m. from the earth's surface, it was not very cogent. This problem was handled by sir John Herschel in an able paper published in the *Edinburgh Review* (January, 1848), in which he clearly showed that the very high latent heat of the air in the higher and rarer parts of the atmosphere would be sufficient to cause an enormous development of heat in the event of the air being compressed before a body advancing into it with a "planetary" velocity. This opinion is now held by almost all eminent men of science. The enormous heat to which the meteor is thus subject produces incandescence, after which, with more or less facility, according to the nature of the materials of which the meteor is composed, the outer portion becomes liquid, and, by the powerful resistance of the air to the meteor's rapid course, is thrown off in a long stream, forming the tail, which, after rapidly losing its velocity, is precipitated to the earth as a fine dust like volcanic ash; while the meteor, thus rapidly and constantly diminishing as it flies along in its headlong course, either becomes wholly dissipated into "tail," falls to the earth, or makes its way out beyond the limits of the earth's atmosphere, and continues its course. This supposition of exclusive atmospheric agency also gives a plausible explanation of the phenomenon of meteors "bursting," this being caused by the sudden heating and consequent expansion of the outer part, while the interior was still in the state of intense cold acquired while in interplanetary space.

While astronomers and physicists in general have been thus trying to reduce the phenomena of meteors to a system, their chemical brethren have not been idle. Public collections of meteoric bodies have been made at Vienna, the British museum, Paris, Berlin; and private ones by Mr. Greg of Manchester, baron Reichenbach in Austria, and prof. Shepard in America; and opportunities have thus been afforded of determining the nature of their composition.

METER (Gr. measure) is that regulated succession of certain groups of syllables in which poetry (q.v.) is usually written. A greater or less number of groups forms a *line* or *verse* (Lat. a turning), and in modern languages, the verses usually rhyme with one

another; although this is not at all essential to the notion of meter. See RHYME, BLANK VERSE. In the classic languages, meter depended upon the way in which long and short syllables were made to succeed one another. English meter depends, not upon the distinction of long and short, but upon that of *accented* and *unaccented* syllables. Thus, in the lines,

The cu'r|few to'lls | the kne'll | of pa'rt|ing da'y—
Wa'rriors and | chi'efs, should the | sha'ft or the | swo'rd—

the accents occur at regular intervals; and the groups of syllables thus formed constitute each a meter or measure. The groups of long and short syllables composing the meters of classic verse were called *feet*, each foot having a distinctive name. The same names are sometimes applied to English measures, an accented syllable in English being held to be equivalent to a long syllable in Latin or Greek, and an unaccented syllable to a short.

Every meter in English contains one accented syllable, and either one or two unaccented syllables. As the accent may be on the first, second, or third syllable of the group, there thus arise five distinct measures, two dissyllabic and three trisyllabic, as seen in the words—1, fo'lly (corresponding to the classic Trochee); 2, reca'll (Iambus); 3, te'rribly (Dactyle); 4, confu'sion (Amphibrachys); 5, absentee' (Anapæst).

These measures are arranged in *lines* or *verses*, varying in length in different pieces, and often in the same piece. The ending measure of a line is frequently incomplete, or has a supernumerary syllable; and sometimes one measure is substituted for another. All that is necessary is, that some one measure be so predominant as to give a character to the verse. Constant recurrence of the same measure produces monotony. The following lines exemplify the five measures:

1st Measure.

Ri'ch the | trea'sure.
Be'tter|si'xty | yea'rs of | Eu'rope | tha'n a | cy'cle | of Caltha'y.

2d Measure.

Alo'ft | in a'w|ful sta'te.
The pro'p|er stu'd|y of | manki'nd | is ma'n.

3d Measure.

Bi'rd of the | wi'lderness.
Wa'rriors and | chi'efs, should the | sha'ft or the | swo'rd.

4th Measure.

The de'w of | the mo'rning.
O you'ng Loch|inva'r has | come ou't of | the we'st.

5th Measure.

As they ro'ar | on the sho're.
The Assy'rian came do'wn | like a wo'lf | on the fo'ld.

It is instinctively felt that some of these measures are better suited for particular subjects than others. Thus, the first has a brisk, abrupt, energetic character, agreeing well with lively and gay subjects, and also with the intense feeling of such pieces as *Scots wha ha'e*. The second is by far the most usual meter in English poetry; it occurs, in fact, most frequently in the ordinary prose-movement of the language. It is smooth, graceful, and stately; readily adapting itself to easy narrative, and the expression of the gentler feelings, or to the treatment of severe and sublime subjects. The trisyllabic meters, owing to the number of unaccented syllables in them, are rapid in their movement, and calculated to express rushing, bounding, impetuous feelings. They are all less regular than the dissyllabic meters. One of them is frequently substituted for another, as in the opening of Byron's *Bride of Abydos:*

Kno'w ye the | la'nd where the | cy'press and | my'rtle
Are e'mblems | of dee'ds that | are do'ne in | their cli'me;
Where the ra'ge | of the vu'll|ture, the lo've | of the tu'r|tle—

where each of the three lines is in a different meter. In addition to this irregularity, one of the unaccented syllables is often wanting. For instance, in Mrs. Hemans's poem, *The Voice of Spring:*

I co'me, | I co'me ! | ye have ca'lled | me lo'ng;
I co'me | o'er the mou'n|tains with li'ght | and so'ng—

the first line has only one measure of three syllables, although the general character of the versification is trisyllabic.

In a kind of verse introduced by Coleridge, and used occasionally by Byron and others, the unaccented syllables are altogether left out of account, and the versification is made to depend upon having a regular number of accents in the line:

There i's not wi'nd enou'gh to twi'rl
The o'ne red le'af, the la'st of its cla'n,
That da'nces as o'ften as da'nce it ca'n
On the to'pmost twi'g that looks u'p at the sky'.

Here there are four accents in each line, but the number of syllables varies from eight to eleven.

To *scan* a line or group of lines, is to divide it into the measures of which it is composed.

The variety of combinations of meters and rhymes that may be formed is endless; but a few of the more usual forms of English versification have received special names, and these we may briefly notice.

Octosyllabics are verses made up each of four measures of the second kind of meter, and therefore containing eight (*octo*) syllables:

With fru'itless la'bor, Cla'ra bou'nd
And stro've | to sta'nch | the gu'shing wo'und.

Scott's poems are mostly in octosyllabics, and so is *Hudibras*, and many other pieces.

Heroic is a term applied to verses containing *five* meters of the second kind, or ten syllables. Heroics either rhyme in couplets, or are without rhymes, constituting blank verse. Many of the chief narrative and didactic poems in the English language are in rhyming heroics; as those of Chaucer, Dryden, Pope, Cowper, etc. Milton's two great poems, Young's *Night Thoughts*, Thomson's *Seasons*, Cowper's *Task*, Wordsworth's *Excursion*, and many others, are written in blank heroics. Metrical dramas are almost always in blank verse; in which case there is frequently a supernumerary syllable, or even two, at the end of the line:

To be, | or not | to be, | that is | the ques|*tion:*
Whether | 'tis no|bler in | the mind | to suf|*fer.*

In *Elegiacs*, the lines are of the same length and the same measure as in heroics; but the rhymes are alternate, and divide the poem into quatrains or stanzas of four lines, as in Gray's *Elegy*. The Spenserian stanza, popularized by Spenser in the *Fairy Queen*, and much used by Byron, differs from common heroics only in the arrangement of the rhymes, and in concluding with an Alexandrine (q.v.)

Service meter, also called *common meter*, is the form of versification adopted in the metrical Psalms, in many hymns, and other lyrical pieces. From being frequently employed in ballads, this meter is also called *ballad meter*. The first and third lines often rhyme, as well as the second and fourth.

Such are some of the more usual and definite forms of versification. In many poems, especially the more recent ones, so much license is assumed, that it is difficult to trace any regular recurrence or other law determining the changes of meter, or the lengths of the lines; the poet seeks to suit the modulation at every turn to the varying sentiments. But it may be questioned whether much of this refinement of art is not thrown away, upon ordinary readers at least, who, failing to perceive any special suitableness, are inclined to look upon those violent departures from accustomed regularity as the results of caprice.

The kind of verse called *hexameter* is described under its own name.

METER, the basis of the "metrical" or modern French system of weights and measures, and the unit of length. The first suggestion of a change in the previous system dates as far back as the time of Philippe le Bel; but up till 1790 no important change had been effected. On May 8, 1790, proposals were made by the French government to the British, for the meeting of an equal number of members from the academy of sciences and the royal society of London, to determine the length of the simple pendulum vibrating seconds in lat. 45° at the level of the sea, with the view of making this the unit of a new system of measures. The British government, however, did not give this proposal a favorable reception, and it fell to the ground. The French government, impatient to effect a reform, obtained the appointment by the academy of sciences of a commission composed of Borda, Lagrange, Laplace, Monge, and Condorcet, to choose from the following three, the length of the pendulum, of the fourth part of the equator, and of the fourth part of the meridian, the one best fitted for their purpose. The commission decided in favor of the last—resolving that the $\frac{1}{10000000}$ of a quadrant of the meridian (the distance from the equator to the pole, measured as along the surface of still water) be taken for the basis of the new system, and be called a "meter." Delambre and Mechain were immediately charged with the measurement of the meridian between Dunkerque and Barcelona; and the result of their labors was referred to a committee of 20 members, 9 of whom were French, the rest having been deputed by the governments of Holland, Savoy, Denmark, Spain, Tuscany, and the Roman, Cisalpine, Ligurian, and Helvetic republics. By this committee the length of the meter was found to be 443.296 Parisian lines, or 39.3707904 English inches; and standards of it and of the kilogram (see GRAM) were constructed, and deposited among the archives of France, where they still remain. The "metrical system" received legal sanction Nov. 2, 1801. The

following are the multiples and fractions of the meter which are in common use, expressed in English measure:

	English Inches.		English Feet.		English Yards.
Millimeter.....	·0393707904				
Centimeter.....	·393707904				
Decimeter.....	3·93707904				
METER.....	39·3707904	=	3·2808992	=	1·093633
Decameter.....	393·707904	=	32·808992	=	10·93633
Hectometer.....	3937·07904	=	328·08992	=	109·3633
Kilometer.....	39370·7904	=	3280·8992	=	1093·633
Myriameter.....	393707·904	=	32808·992	=	10936·33

From the meter the other principal units of measure and weight are at once derived. See ARE, LITER, GRAM, FRANC.

METER (*ante*). It is probably that in reality the meter of the French archives is not exactly what it was supposed when determined; for the measurement was made upon the supposition that the earth is a regular spheroid having an ellipticity of $\frac{1}{305}$, but it is more probable according to the investigations of gen. Schubert of the Russian army and capt. Clarke of the British ordnance survey that it has three unequal axes, and that the Paris meridian is a very little longer than was computed by the French mathematicians. Their measurements were accurate and the computations upon them, but they measured only 10° of the Paris meridian, and from this deduced the length of the quadrant. It has, however, been computed that if there be an error in the calculation of the French meridian, the prototype meter of the archives is as near as possible the $\frac{1}{10000000}$ part of the quadrant of the meridian which passes through New York.

In consequence of the discussion it was deemed advisable to have a meeting of an international commission to settle the question; 30 independent powers were represented in the commission which assembled at Paris in 1870. Their deliberations were interrupted by the Franco-Prussian war, but were resumed, and resulted in an international convention which established at Paris an international bureau of weights and measures supported by contributions of the participating powers. This bureau was given the care of the prototype standards, and other matters connected with the establishment of the system, and its adoption by other powers. The commission came to the conclusion that the prototype meter, and also the kilogram of the archives, shall be recognized as standards irrespective of any doubts as to their variation from the theoretical value of the Paris meridian. See METRIC SYSTEM.

METER, GAS. See GAS, LIGHTING BY, *ante*.

METHODIST CHURCH, FREE, organized in 1860 at Pekin, N. Y., by a convention of ministers and laymen who were, or had been, members of the Methodist Episcopal church. The various reasons which led to the movement may be summed up in the conviction avowed that the Methodist church had declined from its original simplicity and spirituality. In proof of this it was alleged that many converts had been received without sufficient evidence of repentance and conversion; that worldly practices were tolerated, and engaging in unlawful business was allowed; that the direct witness of the spirit was wanting in many professed Methodists; that power over all sin was not possessed, and that, while entire sanctification was not often even professedly attained, the preaching concerning it was widely divergent and contradictory; that discipline was generally neglected, and by some abandoned; that simplicity in dress had given place to fashionable attire; that free seats had been exchanged for pews; that choirs and organs had broken up congregational praise; that sermons were often read instead of being preached; that very costly church edifices were built and church fairs held; and that oath-bound fellowship in secret societies with irreligious men was tolerated, and even encouraged. In the new organization, bishops were exchanged for general superintendents, to be elected every four years. Quadrennial, annual, quarterly, and district conferences are held, and lay delegates equal in number to the ministers are admitted. The official board is retained. Attendance at class meetings is made a condition of church membership. The preachers in charge nominate, and the classes elect their leaders. The office of presiding elder is retained under the name of district chairman. The articles of faith are the same as those of the Methodist Episcopal church, with two additional: one designed to give emphasis to the doctrine of entire sanctification, and the other to that of endless future rewards and punishment. No persons are admitted to church membership, even on probation, without professing to exercise saving faith in Christ. All members are also required to lay aside all superfluous ornaments of dress, to abstain from the use of intoxicating beverages and of tobacco, and not to join any society requiring an oath, affirmation, or promise of secrecy as a condition of membership. The denomination has made some progress and cherishes the hope of reviving the spirit of primitive Methodism. Their religious services have much of the early warmth and zeal, and congregational singing is universally practiced among them. They have two literary institutions, one at North Chili, N. Y., and the other at Spring Arbor, Mich.: they are conducted in strict accordance with the principles of the denomination, and are making fair progress. The work of the church has been among the poor

and less educated classes, whence chiefly their ministers have been taken. They have not as yet had time or opportunity to build up a denominational literature. A monthly magazine entitled *The Earnest Christian*, and a weekly paper, *The Free Methodist*, are well sustained. Several writers of considerable practical power are highly esteemed within and beyond the denomination. In 1880 they reported 271 itinerant ministers, 328 local preachers, and 12,642 lay members.

METHODIST EPISCOPAL CHURCH (METHODISTS, *ante*) is the name assumed by the Wesleyan Methodists in this country when, after the attainment of national independence, they were organized as a denomination, under rules proposed by John Wesley and adopted by themselves. I. Their doctrine is set forth in 25 articles, formed from the 39 of the church of England by omitting some of them entirely and modifying several of the others, with the design to offer a broad and liberal basis on which the general body of evangelical Christians might unite together in brotherly love. Since 1834 a restrictive rule has removed from the authorities of the church all power to revoke, alter, or change these articles of religion; or to establish any new standards or rules of doctrine contrary to the existing and established doctrinal standards. Their theology is styled by themselves "Arminian," according to what they consider the true import of the name as exhibited in Wesley's doctrinal sermons, *Notes on the New Testament*, and other writings. They adopt his doctrine concerning the "witness of the Spirit" —called by many "assurance"—which he defines as "an inward impression on the soul, whereby the spirit of God immediately and directly witnesses to my spirit that I am a child of God; that Jesus Christ hath loved me and given himself for me; that all my sins are blotted out, and I, even I, am reconciled to God;" and in making this impression Wesley supposes that the Holy Spirit "works upon the soul by his immediate influence, and by a strong, though inexplicable, operation." They generally hold, also, the doctrine which many call "sanctification," or, as Wesley preferred to say, "Christian perfection," and which, as the intelligent among them affirm, negatively "teaches no state, attainable in this life, like that of the angels, or of Adam in paradise, or in which there is an exemption from mistakes, ignorance, infirmities, or temptations;" but positively, "that all saints may, by faith, be so filled with the love of God that all the powers of the soul shall be recovered from the abnormal, perverted, sinful condition, and, together with the outward conduct, be controlled in entire harmony with love." II. The government of the Methodist church is administered in a series of 5 conferences (see CONFERENCES OF THE METHODIST EPISCOPAL CHURCH), in addition to which the leaders' and stewards' meeting, presided over by the pastor and consisting of all the class leaders and stewards of his charge, has important functions connected with the well being and efficiency of each particular church. Evangelization, to extend the work, and supervision, to secure firmly all advantages gained, were at the beginning the two fundamental principles adopted, and they are still diligently maintained. The bishops preside in the conferences; form the districts according to their judgment; appoint the preachers to their fields, permitting none to continue more than three successive years in the same charge, except the presiding elders, whose term may extend to four years, and a few others by special appointment; ordain deacons, elders, and bishops newly elected; travel through the denomination at large, and oversee, in accordance with the rules of the general conference, the spiritual and temporal affairs of the church. They have no particular dioceses, but exercise a joint jurisdiction over the whole church as an itinerant general superintendency. They annually arrange and divide the work among themselves, being responsible for its performance to the general conference, by which they are elected and have their respective residences assigned. As an elder was originally put in charge of a district containing several circuits, he was practically a presiding officer over them. Thus the office of presiding elder was gradually established, and became very useful. It is a sub-episcopate, charged with the duties of oversight and administration in a limited sphere, and makes the ecclesiastical system complete and strong. Their intimate acquaintance in their districts with both pastors and people, and their presidency in the quarterly conferences, enable the presiding elders to give valuable information and counsel to the bishop in arranging the appointments. In doing this, usage makes them the bishop's advisers, but with no actual authority, as the church considers it wise to put the whole responsibility of the appointments on the bishop. Candidates for admission to an annual conference are put on probation for two years in the itinerant work, and are subjected to a thorough examination in prescribed studies; and all who are approved in these trials are ordained deacons; and in two years more, if they complete the required studies, they are ordained as elders. The former administer baptism, solemnize marriage, assist elders in administering the Lord's-supper, and perform all the duties of a traveling preacher; and the latter, in addition to these, administer the Lord's-supper. An elder, deacon, or preacher, may be in charge of a circuit or station with similar functions, except as to the administration of the sacrament. He is the chief executive officer of the local church, charged with the care of its interests according to the requirements of the discipline; and is responsible to the annual conference for his fidelity in performing all his ministerial duties, and for his moral deportment. In subordination to him, class leaders, or sub-pastors, have the special oversight of small portions of the church members whom they meet weekly for "social religious worship, and for instruction,

encouragement, and admonition." Local preachers have a share in the acts of the district and quarterly conferences; and as a lay ministry form a body of self-supporting evangelists more numerous than "the itineracy," which, in many sections of the church and various phases of society, has been very useful. All church buildings and parsonages belong to the local society, and are held by trustees chosen according to the law of the state or territory wherever a particular mode is prescribed, and in other cases by the quarterly conference. Admission to membership in the church is preceded by a probation of six months or longer, as may be determined in particular cases, after which the probationer may be admitted to full membership by complying with the rules prescribed. Members of other evangelical churches, coming with proper testimonials, are received into fellowship without probation. III. PROGRESS OF THE CHURCH. 1. *Pioneer Work.* Methodism, says the historian of the church, presented itself to the new nation as an Episcopal church with all the necessary functions and functionaries of such a body; the only one of Protestant denomination, for the colonial fragments of the English establishment had not yet been reorganized. Led by their bishops, the itinerants went forward in their work, convinced, as they said, "that they were raised up to reform the continent, and to spread scriptural holiness over these lands." Thus, "feeling that their one great work was to save souls," they retained and built up what had already been gained, and, pressing on into new fields, preached wherever hearers could be found. Crossing the Alleghanies they were always with the advance, and were soon found also in New England, Canada, and Nova Scotia. Gowns and prayer-books obstructed their progress and were therefore abandoned. Their system was, in a great degree, constructed to meet the exigencies of the work. Their "class and prayer meetings trained most, if not all, the laity to practical missionary labor, and three or four of them, meeting in any distant part of the earth by the emigrations of these times, were prepared immediately to become the nucleus of a church. The lay or local ministry, borne on by the tide of population, were found almost everywhere, prior to the arrival of regular preachers ready to sustain religious services—the pioneers of the church in every new field." At the end of the century they had increased their 15,000 members to 65,000 and their 80 itinerants to 280, besides many who, physically unequal to the strain of the advance, still did their utmost in easier fields. Bishop Coke's stay in the country was only for limited periods, and after 1787 some of the more arduous portions of the episcopal labors devolved on bishop Asbury alone, who was the chief apostle of the church, consecrating to the work all his powers, making himself an example to all in self-denying toil, giving personal attention to minute details, and visiting much from house to house. One of the first Sunday-schools in America was organized by him in 1786, and four years after the conference ordered Sunday-schools to be generally established for the instruction of "poor children, white and black, in learning and piety." 2. *Denominational Institutions.* (1.) "The Book Concern." In 1788 a "book steward" was appointed, and a borrowed capital of $600 obtained. In 1804 the concern was removed from Philadelphia to New York, and subsequently enlarged the number of its publications, scattering them through the circuits by making all the preachers agents, who, although too busy to write books, could sell them and thus greatly increase the efficiency of their work. In 1818 the *Methodist Magazine* was commenced, and, now called the *Methodist Quarterly Review*, has attained a high rank among religious journals, and has a considerable circulation. In 1820 *Zion's Herald* was commenced by the New England Methodists, and was followed, four years after, by the *Christian Advocate*, the first weekly religious paper published by the book concern. A second publishing house was opened at Cincinnati in 1820; and in 1833 the New York house was removed to larger quarters in Mulberry street, which, in 1836, were consumed by fire at a loss of $250,000. New and better buildings were soon erected on the site, which, having been subsequently enlarged to meet the constantly increasing business, are now used only in the manufacturing of books. The principal office is in the building provided for it and the missionary society, at an expense of a million dollars. (2.) "The Preacher's Fund." From the beginning of their history Methodists have had regard to the wants of their sick and superannuated ministers, and of deceased ministers' destitute families. Funds for their relief have been raised in various ways and have been designated by different names. At present the principal dependence for this purpose is on the contributions of the congregations, which now yield annually $150,000. (3.) "The Missionary Society." The Methodist church itself is justly regarded by its members as one of "the great home-mission enterprises of the North American continent," and for a long time it called for all their resources of men and money. The conference of 1784 ordered a collection to be taken annually in all the principal congregations. While the constant extension of the church was thus a missionary movement, further progress was marked in 1819 by the organization of the missionary society, which, having primary reference to home work, joined with that also the foreign field; in this last its operations, having been gradually extended, now embrace missions in Africa, China, India, Japan, Germany, Switzerland, Denmark, Norway, Sweden, Bulgaria, Italy, Mexico, and South America. Its work is aided by the woman's foreign missionary society, Sunday-school union, tract, freedman's aid, and church-extension societies. (4.) "The educational work began with the church itself." The plan for an academic institute was formed in 1780, the foundation of a building for it being laid at Abington, Md.; and in 1787 Cokesbury college was opened. Its curricu-

lum included "English, Latin, Greek, logic, rhetoric, history, geography, natural philosophy, astronomy, and, when the finances admit of it, Hebrew, French, and German." This building having been burned in 1795, a new one was provided in Baltimore; but in a year this also was lost in the same way. This repeated calamity led bishop Asbury to think that the attention of Methodists should be given to the general establishment of schools from which the high-sounding name of colleges might be withheld. One such school he wished to see in every conference. In 1820 the general conference recommended that each annual conference should establish a school for itself. Several conference schools were soon started, and within 12 years five colleges were founded. These were followed by theological seminaries which, at first, were called biblical institutes. The first projected was located at Concord, N. H., in 1847; and, having been afterwards removed to Boston, became, in 1871, the theological department in the university there. The Garrett biblical institute at Evanston, Ill., founded in 1855, received its name and an endowment of $300,000 from a lady of Chicago. The Drew theological seminary at Madison, N. J. (see MADISON), was established by the gift of Daniel Drew of New York. There are also schools at several points in the Southern states, in Germany, at Frankfort on the Main, and in India. At the close of the centennial year of American Methodism the church reported 25 colleges and theological schools, having 158 instructors, 5,350 students, about $4,000,000 in endowments and other property, and more than 105,000 volumes in their libraries; and also 77 academies, with 556 instructors and nearly 18,000 students of both sexes. 3. *Divisions.* (1.) In 1792 James O'Kelly and some other ministers, with a considerable number of members, dissatisfied with the appointing power being vested in the bishop, without appeal, and unable to effect any modification of a system which the great mass of the church cordially approved, withdrew from the denomination and formed themselves into "The Christian Church." (2.) In 1816 the colored members in and around Philadelphia organized themselves into the African Methodist Episcopal church. (3.) In 1820 a similar movement in and around New York resulted in the formation of the African Methodist Episcopal Zion church. (4.) In 1828 the Canada conference withdrew and became a distinct church. This separation was regarded by both sections as a matter of necessity, and was effected without any interruption of fraternal relations between them. (5.) In 1830 the Methodist Protestant church was formed, having at the outset 83 preachers and 5,000 members. (6.) In 1845, at a convention held in Louisville, Ky., impelled by differences of opinion, feeling, and policy on the subject of slavery, the Methodist Episcopal church, South, was formed by the withdrawal of the southern conferences, embracing about 1350 traveling and 3,160 local preachers, with 495,000 members. Through all these divisions and troubles the church pressed on vigorously with its work. During the war of the rebellion it stood with all its moral power on the side of the union, and more than 100,000 of its members entered the armies of their country. Before and after the close of the war it made preparations for celebrating the centenary of American Methodism by all its churches and people "with devout thanksgiving, by special religious services, and liberal thank-offerings," for which the month of Oct., 1866, was set apart. As at the end of the century, notwithstanding its losses, it contained more than a million of members, the hope was cherished that not less than twice that number of dollars would be given to promote its future work. The expected services were held throughout the church, and at the close of the month the total amount contributed was found to be $8,709,500. 4. *Admission of lay delegates into the general conference.* This important change was inaugurated in 1872, after long consideration throughout the church. The plan adopted provides that "the ministerial and lay delegates shall sit and deliberate together as one body, but they shall vote separately whenever such separate vote shall be demanded by one-third of either order; and in such cases the concurrent vote of both orders shall be necessary to complete an action." According to official reports for 1880 there are 95 annual conferences; 13 bishops; 11,798 itinerant and 12,620 local preachers, making with the bishops a total of 24,431; churches, 17,111, containing 1,723,147 lay members, on probation and in full connection; 20,754 Sunday-schools, containing 1,793,763 officers and scholars; amount contributed during the year for the support and extension of the gospel, at home and in other lands, not less than $14,500,000.

METHODIST EPISCOPAL CHURCH, SOUTH (METHODISTS, *ante*), was organized by a convention of delegates from the southern annual conferences which met at Louisville, Ky., May 1, 1845. Its first general conference met at Petersburg, Va., May, 1846. The property belonging to the whole church was divided, through the action of the supreme court of the United States, in accordance with the plan adopted by the general conference of 1844. A publishing house was established at Nashville, Tenn.; a quarterly review, weekly and Sunday-school papers, books, and tracts were printed. All things went on prosperously until the war of the rebellion hindered the work of the church and broke up its institutions. Much of its property was used by others during the continuance of military operations in the south, but the greater part of this has since been restored. The church is fast recovering from the effects of the war. At the separation, in 1844, the southern church contained about 450,000 members. In 1860 the number had increased to 757,205, of whom 207,766 were colored people. During the war these figures were greatly reduced. Some modifications in the government of the church

have been made. The annual conferences are composed of traveling ministers and four lay delegates (one of whom may be a local preacher) from each district. The general conference contains an equal number of ministerial and lay delegates. A revised edition of Wesley's abridged liturgy has been published, but is not much used. The ritual and the psalmody have been revised and improved. Much attention is given to Sunday-schools, and many publications for their use are prepared. Seminaries for both sexes, colleges, and universities have been established in different parts of the south. The publishing house has revised and reprinted the standard Methodist works, and have added to them many new books of history, biography, and theology. The publishing house, destroyed, in part, by fire in 1872, has been rebuilt on a much larger scale. The destitute portions of the south, laid waste by the war, require a large amount of missionary labor; and, in addition to this, missions have been established in China, Mexico, and among the Indians. The statistical reports for 1879, the latest that are accessible at the north, give 39 annual conferences; bishops, 6; traveling preachers, 3,867; local ditto, 5,832; members of churches, 822,476; Sunday-schools, 8,941; containing 58,528 teachers and 421,137 scholars. The total amount expended in supporting and extending the gospel at home and abroad is not reported.

METHODIST PROTESTANT CHURCH, organized in 1830 by a portion of the Methodist Episcopal church who, agreeing with the majority in doctrine, were opposed to the episcopacy and to the exclusion of the laity from a voice in the government of the church. Each annual conference elects by ballot its presiding officer, and in all legislation and government the laity and clergy equally participate. The general conference, meeting every four years, is composed of delegates elected by the annual conferences in the ratio of one minister and one layman for every 1000 communicants. Under specified restrictions it has authority to make rules for the government of the church declarative of the laws of Christ; to determine the duties and compensation of traveling ministers, preachers, and other officers; to devise ways and means for raising funds; and to declare the boundaries of the annual conferences. The annual conference, consisting of all the ordained itinerant ministers in the district, elects to orders, stations ministers, preachers and missionaries, makes rules for their support, and declares the boundaries of circuits and districts. The quarterly conference—composed of the trustees, ministers, preachers, exhorters, leaders, and stewards of a district—examines the official character of its members, licenses preachers, and recommends candidates for ordination to the annual conference. The classes, leaders, and stewards are similar to those in the Methodist Episcopal church. In 1858 the Methodist Protestant church was divided by differences on the subject of slavery into the Methodist Protestant church of the north-western states, with its headquarters at Springfield, Ohio; and the Methodist Protestants of the southern states, with headquarters at Baltimore. At the time of the division the church contained 2,000 stationed ministers, 1200 churches, 90,000 members, and property worth $1,500,000. In the hope of a speedy reunion of the separated branches, the Protestant Methodists, North, changed their name to *The Methodist Church*, and removed their headquarters to Pittsburg, Penn. Their college at Adrian, Mich., is flourishing. Their missionary board, while zealously engaged in the home work, has also formed plans for the foreign field. The strength of the Methodist Protestants, South, was principally in Virginia, Maryland, and some parts of Pennsylvania and Ohio. They have three colleges: the Western Maryland, at Westminster, Carroll co.; Yadkin college, North Carolina; and one in Western Virginia. Initiatory steps had been taken with a view to the union of all non-Episcopal Methodists under the title of *The Methodist Church*, but before this was accomplished the two branches of the Methodist Protestants met in convention at Baltimore in 1877 and formed an organic union under the original name of the Methodist Protestant church. In 1880 the reunited church reported 1314 itinerant ministers, 925 local preachers, and 113,405 lay members. Their headquarters are continued both at Baltimore and Pittsburg.

METHODISTS, the name originally given, about the year 1729, by a student of Christ Church to the brothers Wesley and several other young men of a serious turn of mind, then members of different colleges of Oxford, who used to assemble together on particular nights of the week chiefly for religious conversation. The term was selected, it is believed, in allusion to the exact and *methodical* manner in which they performed the various engagements which a sense of Christian duty induced them to undertake, such as meeting together for the purpose of studying Scripture, visiting the poor, and prisoners in Oxford jail, at *regular* intervals. Subsequently it came to be applied to the followers of Wesley and his coadjutors, when these had acquired the magnitude of a new sect; and though their founder himself wished that "the very name," to use his own words, "might never be mentioned more, but be buried in eternal oblivion," yet it has finally come to be accepted by most if not all of the various denominations who trace their origin mediately or immediately to the great religious movement commenced by John Wesley. For an account of the origin and earlier development of Methodism see articles on the brothers WESLEY and WHITEFIELD. We confine ourselves here to a brief notice of its organization, doctrine, and present condition.

1. *Organization.*—This appears to have been partly improvised by Wesley to suit the exigences of his position. It was not a theoretical and premeditated, but a practical and

extempore system. In the *Rules of the Society of the People called Methodists*, drawn up by himself, he says: "In the latter end of the year 1739, eight or ten persons came to me in London, who appeared to be deeply convinced of sin, and earnestly groaning for redemption. They desired (as did two or three more the next day) that I would spend some time with them in prayer, and advise them how to flee from the wrath to come, which they saw continually hanging over their heads. That we might have more time for this great work, I appointed a day when they might all come together, which from thenceforward they did every week, viz., on Thursday, in the evening." This he calls "the first Methodist society." Its numbers rapidly increased, and similar "societies" were soon formed in different parts of England, where the evangelistic labors of the Wesleys had awakened in many minds "a desire to flee from the wrath to come, and be saved from their sins" —the only condition, we may remark, required of any for admission into these societies. In order to ascertain more minutely how the work of salvation was progressing in individual cases, Wesley subdivided the societies into "classes," according to their respective places of abode, each class containing about a dozen persons, under the superintendence of a "leader," whose duties are partly religious and partly financial. 1. He has to see each person in his class once a week, "to inquire how their souls prosper," and to encourage, comfort, or censure, as the case may require. 2. To collect the voluntary contributions of his class, and pay it over to the "stewards" of the society, and to give the ministers all necessary information regarding the spiritual or bodily condition of those under his leadership. For preaching purposes, on the other hand, the societies were aggregated—a certain number of them constituting what is called a circuit. This now generally includes a town and a rural circle of 10 or 15 miles. To each circuit two, three, or four ministers are appointed, one of whom is styled the "superintendent;" and here they labor for at least one year, and not more than three. Every quarter the classes are visited by the ministers, who make it a point to converse personally with every member; at the termination of which proceeding a "circuit-meeting" is held, composed of ministers, stewards, leaders of classes, lay-preachers, etc. The stewards (who are taken from the societies) deliver their collections to a circuit-steward, and the financial business of the body is here publicly settled. At this quarterly meeting candidates for the office of the ministry are proposed by the president, and the nomination is approved or rejected by the members. Still larger associations are the "districts," composed of from 10 to 20 circuits, the ministers of which meet once a year, under the presidency of one of their number, for the following purposes: 1. To examine candidates for the ministry, and to try "cases" of immorality, heresy, insubordination, or inefficiency on the part of the clergy. 2. To decide preliminary questions concerning the building of chapels. 3. To investigate and determine the claims of the poorer circuits to assistance from the general funds of the body. 4. To elect a representative to the committee of conference, whose duty is to nominate ministers for the different stations for the ensuing year—their appointments, however, being subject to the revision of conference. In all the financial and other purely *secular* business of the districts, laymen (such as circuit-stewards and others) deliberate and vote equally with the clergy. The supreme Methodist assembly is the "conference." The first was held in 1744, when John Wesley met his brother Charles, two or three other clergymen, and a few of the "preachers"—men whom his zeal and fervor had induced to abandon their secular employments and devote themselves to declaring the message of the Gospel. The purpose for which he called them together was, he says, "for the sake of conversing on the affairs of the 'societies' . . . . . and the result of our consultations we set down to be the rule of our future practice." In the course of his life Wesley presided at 47 of these annual assemblies. The conference now consists of 100 ministers, mostly seniors, who hold their office according to arrangements prescribed in a deed of declaration, executed by John Wesley himself, and enrolled in chancery. But the representatives previously mentioned, and all the ministers allowed by the district committees to attend—who may or may not be members of the legal conference—sit and vote usually as one body, the 100 confirming their decisions. In this assembly, which is exclusively clerical, every minister's character is subjected to renewed and strict scrutiny, and if any charge be proved against him, he is dealt with accordingly; candidates for the ministry are examined both publicly and privately, and set apart to their sacred office; the entire proceedings of the inferior courts (if we may so call them) are finally reviewed; and the condition, requirements, and prospects of the body are duly considered.

2. *Doctrine and Worship.*—Under this head not much requires to be said. Wesleyan Methodists claim to be considered *orthodox*, *Protestant*, and *evangelical*. The propriety of the last two appellations will probably not be disputed, but a rigid Calvinist might object to the first. They accept the *articles* of the English church, but believing these articles to have been framed on a basis of *comprehension*, they consider themselves at liberty to accept them in an Arminian sense. It must not, however, be supposed that they are out-and-out Arminians. Their great distinguishing doctrine is the universality and freedom of the atonement; hence they reject the Calvinistic doctrine of predestination (which they conceive to be incompatible with the former), but while they maintain the freedom of the will and the responsibility of man, they also maintain his total fall in Adam, and his utter inability to recover himself. If these two appear to the human understanding to conflict, it is nevertheless asserted that the Bible teaches both; and it is

objected to high Calvinism that in its anxiety to be logical it has shown itself unscriptural. Prominence is also given by the Wesleyan Methodists to certain points of religion, some of which are not altogether peculiar to them. They insist on the necessity of men who profess to be Christians feeling a *personal interest* in the blessings of salvation—i.e., the assurance of forgiveness of sins and adoption into the family of God. This, however, is not to be confounded with a certainty of *final salvation*. They believe the spirit of God gives no assurance to any man of that, but only of *present pardon*. In harmony with this view, they reject the doctrine of the necessary perseverance of the saints, and hold that it is fearfully possible to fall from a state of grace, and even to perish at last after having "tasted of the heavenly gift," and having been "made partakers of the Holy Ghost." They also maintain the perfectibility of Christians, or rather the possibility of their entire sanctificaction as a privilege to be enjoyed in this life. But Wesley "explains" that "Christian perfection does not imply an exemption from ignorance or mistake, infirmities or temptations; but it implies the being so crucified with Christ as to be able to testify, 'I live not, but Christ liveth in me.'" He regards the sins of a "perfect" Christian as "involuntary transgressions," and does not think they should be called "sins" at all, though he admits that they need the atoning blood of Christ. The Wesleyan Methodists, in their religious services, use more or less the English liturgy; the morning service being read in many of their chapels, and the sacramental offices being required in all. They observe a "watch-night" on the eve of the new year, on which occasion the religious services are protracted till midnight, and their chapels are generally crowded to excess; and in the beginning of the year they hold a "covenant-service," at which congregations stand up to a man (though this form is not invariable), and solemnly vow to serve the Lord. But even the ordinary religious services in some places are frequently marked by an ebullition of fervent feeling on the part of the audience, which has a very singular effect upon a stranger.

3. *History*.—The history of Methodism is for many years the history of Christian effort to evangelize the neglected "masses" of England. The labors of Wesley, and of those whom he inspired to imitate his example, were of the noblest description, and met with remarkable success. The reformation of life which his preaching produced, for example, among the Kingswood colliers and the Cornwall wreckers, is a testimony to the power of religion which cannot be too highly estimated. The zeal which has inspired the body in regard to foreign missions, although in the highest degree honorable, is only the logical development of their efforts at home—for they originally regarded their society in England as simply a vast "home mission," and neither Wesley nor his followers desired to consider themselves a "sect," a new church, in the common usage of the term, but were warmly attached to the old national church, and considered themselves among her true children. When Wesley died (1791) his "societies" had spread over the United Kingdom, the continent of Europe, the states of America, and the West Indies, and numbered 80,000 members. Since then they have largely increased, and, according to the returns for the year 1875, the membership (including the numbers in foreign missions, embracing continental India, Northern Europe, China, Asia Minor, the South Sea and West India islands) amounted then to 564,315 (of whom 393,343 belonged to Great Britain and Ireland), and the number of ministers, 2,905 (of whom 2,050 belonged to the United Kingdom). The annual income of "The Wesleyan Methodist Missionary Society" in 1875 was £190,000.

The Wesleyan Methodists have three theological colleges for the training of ministers, one at Richmond Hill, Surrey, a second at Didsbury, South Lancashire, and a third at Headingley, in Yorkshire, besides the establishments at Sheffield and Taunton; two schools (New Kingswood school and Woodhouse Grove school) for the education of sons of Wesleyan ministers; and two for the daughters, one at Clapton and another at Southport. The boys receive a six years' and the girls a four years' course of instruction. The Methodist Book-room is situated in the City Road, London, and issues hundreds of thousands of religious publications (tracts, etc.) monthly. The newspapers and other periodicals, professedly in connection with the body, are the larger and smaller *Magazines*, the *Christian Miscellany*, *Wesleyan Sunday-School Magazine*, monthly *Exercises on Scripture Lessons*, *Early Days*, the *Watchman*, the *Methodist Recorder*, and the *London Quarterly Review*. Among the more eminent Methodist authors may be named the two Wesleys, Fletcher, Benson, Clarke, Moore, Watson, Drew, Edmondson, Sutcliffe, Jackson, Treffry, Rule, Nichols, Smith, and Etheridge.

Methodist Episcopal Church, the name given to the Society of Wesleyan Methodists in the United States, where the first members of that body—immigrants from Ireland—established themselves as a religious society in New York in the year 1766. In the course of a year or two their numbers had considerably increased, and they wrote to John Wesley to send them out some competent preachers. Two immediately offered themselves for the work, Richard Boardman and Joseph Pilmoor, who were followed in 1771 by Francis Asbury and Richard Wright. The agitations preceding the war of independence, which soon afterwards broke out, interrupted the labors of the *English* Methodist preachers in America, all of whom, with the exception of Asbury, returned home before the close of the year 1777; but their place appears to have been supplied by others of native origin, and they continued to prosper, so that, at the termination of the revolution-

ary struggle, they numbered 43 preachers and 13,740 members. Up to this time, the American Wesleyan Methodists had laid no claim to being a distinct religious organization. Like Wesley himself, they regarded themselves as members of the English Episcopal church, or rather of that branch of it then existing in America, and their "preachers" as a body of irregular auxiliaries to the ordained clergy. "Episcopal churches," we are informed, "are still standing in New York and elsewhere, at whose altars Embury, Pilmoor, Boardman, Strawbridge, Asbury, and Rankin, the earliest Methodist preachers, received the holy communion." But the recognition of the United States as an independent country, and the difference of feelings and interests that necessarily sprung up between the congregations at home and those in America, rendered the formation of an independent society inevitable. Wesley became conscious of this, and met the emergency in a manner as bold as it was unexpected. He himself was only a presbyter of the church of England, but having persuaded himself that in the primitive church a presbyter and a bishop were one and the same order, differing only as to their official functions, he assumed the office of the latter, and, with the assistance of some other presbyters who had joined his movement, he set apart and ordained the Rev. Thomas Coke, D.C.L., of Oxford university, bishop of the infant church, Sept. 2, 1784. Coke immediately sailed for America, and appeared, with his credentials, at the conference held at Baltimore, Dec. 25 of the same year. He was unanimously recognized by the assembly of preachers, appointed Asbury coadjutor bishop, and ordained several preachers to the offices of deacon and elder. Wesley also granted the preachers permission (which shows the extensive ecclesiastical power he wielded) to organize a separate and independent church under the episcopal form of government: hence arose the "Methodist Episcopal Church in the United States." Nevertheless, there were not a few who were dissatisfied with the Episcopal form of government. This feeling grew stronger and stronger, until, in 1830, a secession took place, and a new ecclesiastical organization was formed, called the METHODIST PROTESTANT CHURCH, whose numbers, according to the returns for 1874, amounted to 65,000 members and 924 preachers. In 1842 a second secession took place, chiefly on the question of slavery—the seceders pronouncing all slave-holding sinful, and excluding slave-holders from church membership and Christian fellowship; and in 1843 a meeting was held at Utica, N. Y., where a new society was constituted and named the WESLEYAN METHODIST CONNECTION OF AMERICA, whose members in 1870 amounted to 20,000, and its preachers to 250. But in 1844 a far larger and more important secession took place on the same question, when the whole of the Methodist societies in the then slave-holding states, conceiving themselves aggrieved by the proceedings instituted at the general conference of New York (1844) against the Rev. James O. Andrew, D.D., one of the bishops, and a citizen of Georgia, who had married a lady possessed of slaves, resolved to break off connection with their northern brethren. Hence originated the METHODIST EPISCOPAL CHURCH, SOUTH, whose numbers, in 1874, were as follows: Traveling preachers, 3,134; local preachers, 5,344; and members, 663,106, including whites, colored, and Indians. To these must be added 200,000 members forming the African Methodist Episcopal church, and 170,000 of the African Methodist Episcopal Zion church. In 1869 a movement began in favor of the reunion of the northern and southern sections of the Methodist Episcopal churches, which may—now that slavery is abolished—be successfully carried out. It may here be stated that the members of the *Northern Methodist Episcopal Church* amounted in 1874 to 1,345,089.

Returning to the English Wesleyan Methodists, we now proceed to mention the various secessions from the parent body in the order of time.

1. THE METHODIST NEW CONNECTION.—This society detached itself from the older one in 1797. Its doctrines and order are the same; the only difference being that it admits one layman to each minister into the conference, and allows them to share in the transaction of all business, both secular and spiritual. These laymen are chosen either by the circuits, or by "guardian representatives" elected for life by the conference. In 1875 the numbers of the new connection were: members, 24,760; preachers, 159. There were in addition 2,849 members on probation.

2. PRIMITIVE METHODISTS, vulgarly designated RANTERS, were first formed into a society in 1810, though the founders had separated from the old society some years before. The immediate cause of this separation was a disagreement as to the propriety of camp-meetings for religious purposes; and also upon the question of females being permitted to preach. A third point of difference is the admission to their conference of two lay delegates for every minister. In 1875 their numbers were: members, 179,429; preachers, 1169.

3. INDEPENDENT METHODISTS, who separated in 1810. They are chiefly distinguished by their rejection of a paid ministry, and number in England and Scotland: members, 4,000; preachers, 290; scholars, 6,000.

4. BIBLE CHRISTIANS, also called BRYANITES, were formed by a local preacher named Bryan, who seceded from the Wesleyans in 1815. The only distinction between them and the original body appears to be that the former receive the eucharistic elements in a sitting posture. In 1875 their numbers were: members, 26,699; preachers, 276.

5. UNITED FREE CHURCH METHODISTS have been recently formed by the amalgamation of two sects of nearly equal numerical strength. The older of these, called the WESLEYAN ASSOCIATION, originated in 1834 in the removal of one or two influential

ministers from the original connection Points of difference subsequently appeared with regard to the constitution of the conference. The younger sect, called the WESLEYAN REFORM ASSOCIATION, took its rise in 1849 through the expulsion of several ministers from the parent body on a charge of insubordination, and being founded on the same principles as the last-mentioned community, arrangements were entered into for their union, which was subsequently effected. Church independency, and freedom of representation in the annual assembly, are two of the most prominent distinctive traits in the organization of the united Methodist free church. Their united numbers in 1875 were: members, 71,317; ministers, 375; local preachers, 3,266. The *Wesleyan Reform Union* consists of about 20 ministers and 7,000 members, who have not amalgamated with the Methodist free churches.

This is perhaps also the most convenient place to notice the WELSH CALVINISTIC METHODISTS. They are not a secession from the followers of Wesley, but originated partly in the preaching of his friend and fellow-evangelist Whitefield, and partly in that of Howel Harris, a Welsh clergyman of the church of England. Whitefield was a Calvinist; Wesley, as we have seen, was on some points decidedly Arminian. A difference arose between them on the subject of election. Henceforward their paths lay in different directions. Whitefield, however, did not form a religious sect; and after his death (1769) his followers, being left without any distinct bond or organization, either followed the leading of the countess of Huntingdon (q.v.), or became distributed among other denominations, a large portion, especially in Wales, becoming absorbed in the new society gradually forming itself through the preaching of Howel Harris and his coadjutors. This body, however, was not formally constituted a religious society till the beginning of this century.

METHODIUS, a noted theologian of the eastern church of the 3d c.; one of the fathers and martyrs of the church. He was surnamed Eubulus and Eubulius. He was first the bishop of Olympa and Patara in Lycia, hence called Patarensis, and afterwards presided over the see of Tyre and Palestine. He is supposed to have died early in the 4th century. He was a contemporary of Porphyry, and suffered death probably in A.D. 303 or 311. Epiphanius says that "he was a very learned man, and a strenuous asserter of the truth." Jerome ranks him among the church writers. His principal works are *De Resurrectione*, against Origen; *De Creatis; De Libero Arbitrio; De Angelica Virginitate et Castitate*, written in the form of a dialogue; *Oratio de Simeone et Anna Seu in Festum Occursus et Purificationis B. Mariæ.*

METHOMANIA. See DIPSOMANIA, *ante.*

METHUEN TREATY, a commercial treaty between England and Portugal in 1703, so called in consequence of being negotiated by Paul Methuen of Corsham, English ambassador at Lisbon. It was agreed, by the treaty, that the wines of Portugal should be received by England at a rate of one-third less duty than those of France. In 1836 the Portuguese government relinquished the stipulations of the treaty.

METHYL is an organic radical homologous with ethyl (q.v.), being the lowest term in the series $C_nH_n + 1$, n in this case being equal to 2. Its formula is C_2H_3; but in its free state, two atoms unite to form a single molecule, so that free methyl is more accurately represented by $(C_2H_3)_2$. It is a colorless gas, of specific gravity 1.036; it burns with a very feeble bluish flame, and is not liquefied at a temperature of 0°. It is obtained by acting upon iodide of methyl with zinc, in the same manner as in the preparation of ethyl.

Like ethyl, it forms a very numerous class of compounds, of which the following are the most important: *Hydride of methyl* (C_2H_3,H), known as *light carbureted hydrogen* (q.v.), *marsh-gas*, and *fire-damp*, may be obtained either naturally or artificially. As a natural product, it sometimes issues from fissures in coal-seams, rushing forth as if under high pressure. These discharges of this gas are termed "Blowers" by the miners, and it is by the combustion of this fire-damp that the terrific explosions which occasionally take place in coal-pits are caused. For its combustion, twice its volume of oxygen (and consequently ten times its volume of air) is required; the resulting compounds being one volume of carbonic acid and two of steam. The vitiated air thus produced, which is utterly unfit for respiration, is known as the *after-damp* or *choke-damp*, and is as much dreaded as the explosion itself. Hydride of methyl is also one of the gaseous exhalations from marshes and stagnant pools; and the bubbles that rise to the surface when the mud at the bottom of a pond is stirred up, consist chiefly of this gas. It may be prepared artificially by strongly heating a mixture of crystallized acetate of soda, hydrate of potash, and powdered quicklime. It is a colorless, inodorous, tasteless gas, which may be breathed without apparent injury if well diluted with air. *Hydrated oxide of methyl* (C_2H_3O,HO), known also as *methylic alcohol*, *wood spirit*, and *proxylic spirit* (under which title its properties are described), is the strict homologue of vinous or ethylic alcohol (C_4H_5O,HO). *Oxide of methyl* (C_2H_3O), or *methylic ether*, corresponds to the ordinary, or, correctly speaking, the ethylic ether, and, like the latter, is produced by the distillation of a mixture of methylic alcohol and sulphuric acid. Oxide of methyl, like oxide of ethyl, combines with acids to form a class of ethereal salts, or compound ethers, as they are termed by some chemists—as, for example: Acetate of methyl (or methyl-acetic ether), C_2H_3O,$C_4H_3O_3$; butyrate of methyl (or methyl-butyric ether) C_2H_3O,$C_8H_7O_3$;

nitrate of methyl (or methyl-nitric ether), C_2H_3O,NO_5; salicylate of methyl (or methyl-salicylic ether), $C_2H_3O,C_{14}H_5O_5$. The last-named compound may not only be obtained by distilling a mixture of pyroxylic spirit with salicylic and sulpharic acids, but occurs ready formed in the vegetable kingdom, constituting the essential oil procured from the *betula lenta*, a species of birch, and from the *gaultheria procumbens*, or *winter green*.

Methyl may be made to enter into combination with bromine, iodine, chlorine, and fluorine, the bromide and iodide of methyl being colorless fluids, and the chloride and fluoride colorless gases. Amongst the most interesting of the numerous methyl compounds must be mentioned the artificial bases or alkalies, which can be obtained from ammonia by the substitution of one, two, or three equivalents of methyl for one, two, or three of the equivalents of hydrogen contained in the ammonia.

If only one equivalent of hydrogen is replaced by methyl, the resulting compound is $NH_2(C_2H_3)$ or C_2H_5N, an extremely alkaline gas known as *methylamine*, or *methylia*, which is more soluble in water than any other known gas; water at 55° dissolving 1150 times its bulk. It is a frequent product of the destructive distillation of nitrogenous substances; and it is present when many natural alkaloids, such as narcotine and morphia, are distilled with caustic potash. The product resulting from the substitution of two equivalents of methyl for two of hydrogen, and known as *dimethylamine*, closely resembles methylamine. When the three equivalents of hydrogen are replaced by three of methyl, the resulting compound is $N(C_2H_3)_3$ or C_6H_9N, a colorless gas, which is known as *trimethylamine*, or *trimethylia*, and has a disagreeable fishy odor. It occurs in large quantity in herring-brine, and has been detected in the spirit in which anatomical preparations have been long kept. It is also found in *chenopodium vulvaria* (stinking goose-foot), in the flowers of *cratægus oxyacantha* (common hawthorn), and in ergot of rye.

METHYLATED SPIRIT consists of a mixture of alcohol, of specific gravity 0.830, with 10 per cent of pyroxylic (q.v.) or wood-spirit. This addition of wood-spirit renders it unfit for drinking, although it scarcely interferes with its power as a solvent. It is allowed by the excise to be sold duty-free for manufacturing purposes, and for preserving specimens in museums.

METHYLENE, Bichloride of (C_2H_2,Cl_2), is an organic compound which has recently attracted much attention from its value as an anæsthetic agent. Dr. Richardson, who has long been studying the physiological properties of the methyl-compounds, with the view of finding amongst them a safer compound than chloroform, believes, from his experiments on animals, that in the subject of this article he has found such a compound. As the deaths from chloroform may be computed, according to him, at one in 1500 administrations, it is obvious that there is reason for searching for a still safer anæsthetic agent. Dr. Snow, as is well known, thought that he had discovered an almost positively safe agent in amylene ($C_{10}H_{10}$); but the value of more than 200 safe administrations was at once destroyed by two rapidly succeeding deaths; and hence a large number of successful cases of the new agent must be reported before it will displace chloroform from its present well-deserved position. In the article on methyl (q.v.), we have shown that the composition of hydride of methyl (or marsh gas) is expressed by C_2H_3,H, which may be written C_2HHHH. Now, according to the theory of substitutions, one, two, three, or even all four of the atoms of hydrogen may be replaced by a corresponding number of atoms of chlorine. Thus (*a*), if one atom of H be replaced by one atom of Cl, we have *chloride of methyl*, C_2H_3Cl; (*b*) if two atoms of H are replaced by two atoms of Cl, the resulting compound is *bichloride of methylene*, $C_2H_2Cl_2$, the C_2H_2 here representing a new radical termed methylene, of which very little is known; (*c*) if three atoms of H are replaced by three atoms of Cl, the resulting compound is *terchloride of formyle*, C_2HCl_3, or common chloroform, another radical, viz., formyle, C_2H, now appearing; (*d*) if the whole of the H is replaced by Cl, the resulting compound is *tetrachloride of carbon*, CCl_4. We thus have four new bodies which may be constructed step by step out of hydride of methyl or marsh gas, and similarly, by starting with tetrachloride of carbon, the chemist may retrace the individual stages till he gets back to marsh gas. All these derivatives of marsh gas possess the power of producing anæsthesia when they are inhaled as vapor by men and animals. That the latter two—viz., chloroform and tetrachloride of carbon—possess this power, has been long known, Dr. P. Smith having especially directed attention to the properties of the last-named compound; but that the first two also exert the same influence is a fact new to science, for which we are indebted to Dr. Richardson. "I discovered," he observes, "that chloride of methyl was a certain and gentle anæsthetic in July [1867] last, and this led me to hope that something more stable and manageable could be obtained—something that should stand between the chloride of methyl and chloroform. That substance is now found in the bichloride of methylene. That this compound would produce rapid, safe, and easy general anæsthesia, I discovered by experiment on Aug. 30 of the present year."—*Med. Times*, Oct. 19, 1867.

It is a colorless fluid, having an odor like that of chloroform; and is pleasant to inhale, as it causes little irritation to the mucous membrane. It boils at 88°, and has a spec. gr. of 1.344, while that of its vapor is 2.937 (or nearly three times that of air).

Hence, it boils at a lower temperature than other anæsthetics; while its specific gravity, both as a liquid and a vapor, is lower than that of chloroform, but much higher than that of ether; hence, from its easier evaporation, it requires more free administration than chloroform, and, from its greater vapor-density, it should be given less freely than ether. It mixes readily with absolute ether, and this combination yields a vapor containing corresponding proportions of each, their boiling-points only differing at most by 4°. It also combines with chloroform in all proportions. It should have a neutral reaction to test-paper. If a trace of acid be present—which is possible, but not probable—its inhalation might prove dangerous. To prevent decomposition, it should, like chloroform, be well guarded from the action of light.

Pigeons are the animals which Dr. Richardson most employs for experiments on anæsthetic agents generally. They present various advantages over most other animals; one of the most important being that they die with singular readiness under the influence of these agents. On exposing three pigeons to the action of the vapor of a dram of chloroform, bichloride of methylene, and tetrachloride of carbon, the peculiarity in the action of the bichloride is the absence, in the sleep it produces, of the so-called second degree of narcotism. The bird glides from the first degree directly into the third, or that of absolute insensibility. The bichloride enters the circulation freely, and sustains the insensibility so well, that intervals of many minutes may be allowed to pass without readministration; while, from its being transformed altogether into vapor at a temperature lower than that of the body, it can be more readily eliminated from the system than chloroform, or tetrachloride of carbon, when its administration is withheld. On animals it acts more evenly on the respiration and circulation than any other of the various substances which Dr. Richardson has tried; and the only drawback yet observed is, that it sometimes produces vomiting; but this misadventure, so far as we know, has not yet been observed when it has been administered to the human subject, and pigeons are known to vomit on slight provocation. The numbers of the respirations and of the pulse rise and fall together, which "is a good point, because there is no condition more perilous than disturbed balance of the circulating and respiratory systems."

All anæsthetics given by inhalation after a certain dose destroy life; but that the destructive power of this new agent is less than that of either chloroform or tetrachloride of carbon, seems proved.

On trying the vapor upon himself, after ascertaining that it could be safely given to the lower animals, Dr. Richardson inhaled it until it produced insensibility. "I found the vapor very pleasant to breathe and little irritating, while drowsiness came on and unconsciousness without any noise in the head or oppression. I recovered also, as the animals seemed to recover, at once and completely. I felt as though I had merely shut my eyes, and had opened them again. In the mean time, I had, however, performed certain acts of a motor kind unconsciously; for I inhaled the vapor in the laboratory, and there went to sleep, but I awoke in the yard adjoining. This was on Sept. 28 last, when I inhaled from a cup-shaped sponge. Since then, I have inhaled the vapor in smaller quantities from several instruments, with the effect of proving that there is little difference required for its administration and that of chloroform. A little more bichloride is required in the earlier stages than would be required if chloroform were being used, the fluid being more vaporizable. One dram of bichloride to 40 minims (⅜ds of a dram) of chloroform represents the difference required; but when the narcotism is well set up, less of the bichloride is required to sustain the effect."

The materials on which this article is based are taken from a lecture delivered by Dr. Richardson on Oct. 8, 1867. In an address on anæsthetics by Dr. Tidy, published in the *British Medical Journal*, Jan. 4, 1879, it is mentioned that Mr. Morgan, a dentist, has "administered methylene 1800 times to persons of all ages, and for periods varying from a few minutes to three-quarters of an hour, without a single accident. He also regards it as safer than chloroform, and speaks of the rapidity with which it effects complete unconsciousness, as a rule two minutes only being needed; the rapidity of recovery, from one to three minutes only being required for the anæsthesia to pass away; and lastly, the rapidity with which consciousness may be abolished, if it return during the operation—as the chief points in its favor. The cause of death from its administration is syncope, not coma; hence, a bloodless condition of the lips—a point easily to be noticed—is the principal indication of danger."

On the other hand, the preliminary report on the action of anæsthetics presented to the committee of the British medical association, and published in the same number of the *Journal*, does not speak so favorably of methylene. The so-called bichloride of methylene, it is alleged, has no definite and constant boiling point, and therefore appears to be a mixture. The formula, as now generally used, CH_2Cl_2, shows it to be a compound of chloride of methyl and chloroform ($CH_3Cl + CHCl_3$). With frogs under methylene it was found that the heart became rapidly affected and soon stopped. With rabbits, respiration rapidly deteriorated and stopped while the heart was still beating. In an experiment with artificial respiration and exposure of the heart, the heart was weakened and soon stopped, but not as rapidly as with chloroform. As in the case of chloroform, the right ventricle became enormously distended, the first sign of paralysis being the commencement of the distension. [Ether does not affect the heart.] The experimenters found that as anæsthetics, *isobutyl chloride* (C_5H_9) and *ethidene dichloride*

($C_2H_4Cl_2$) combine the advantages of speed and safety, and are therefore preferable to methylene.

Chloride of methyl, the first of the compounds derived by substitution from hydride of methyl, has, according to good authorities, also valuable remedial qualities. Half an ounce of it, diluted with water, and with the addition of a little sugar, acts as a pleasant but potent intoxicator. In smaller doses, it might be useful as a soothing and refrigerating agent.

METON'IC CYCLE, so called from its inventor, Meton, who flourished at Athens about 432 B.C., is a cycle of 19 years, at the end of which time the new moons fall on the same days of the year, and eclipses recur in nearly the same order. This arises from the circumstance, that 19 solar years are nearly equal to 235 lunations, their average values being 6939.68835 and 6939.60249 days respectively.

METON'IC CYCLE, *ante*. The discovery of the Metonic cycle forms an era in the history of the early astronomy of Greece. The Chaldeans established several luni-solar periods; and the difficulty of reconciling the motions of the sun and moon, or of assigning a period at the end of which these two luminaries again occupy the same positions relatively to the stars, had long embarrassed those who had the care of regulating the festivals. The discovery of Meton, therefore, which was brought into use on July 16, 433 B.C., was received with acclamation by the people assembled at the Olympic games, and adopted in all the cities and colonies of Greece. It was also engraved in golden letters on tables of brass, whence it received the appellation of the *golden number*, and has been the basis of the calendars of all the nations of modern Europe. It is still in ecclesiastical use, with such modifications as time has rendered necessary.—The period of Meton consisted of twelve years, containing twelve months each, and seven years containing thirteen months each; and these last formed the 3d, 5th, 8th, 11th, 13th, 16th, and 19th years of the cycle. He divided the cycle into 125 full months of 30 days, and 110 deficient months of 29 days each; the whole exceeding 19 revolutions of the sun by 9½ hours, and exceeding 235 lunations by 7½ hours. A century after Meton, his cycle was corrected by Calippus by quadrupling the period of 6,940 days, and deducting one day at the end of that time by changing one of the full months into a deficient month. By this change the error of lunation was reduced to one day in 304 years. The calendar, as laid down by Ideler, was as follows:

Months.	Year of the Cycle.																		
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII	XIX.
Hecatombeon.....	30	29	30	30	30	30	29	30	30	30	29	29	30	30	30	29	29	30	30
Metageitnion.....	30	30	29	29	30	29	30	29	29	29	30	30	29	29	29	30	30	29	29
Boedromion.....	29	29	30	30	29	30	29	30	30	30	29	29	30	30	30	29	29	30	30
Pyanepsion.....	30	30	29	29	30	30	30	29	29	30	30	30	29	29	29	30	30	29	30
Memacterion.....	29	29	30	30	29	29	29	30	30	29	29	29	30	30	30	29	29	30	29
Poseideon.....	30	30	29	29	30	30	30	29	29	30	30	30	29	29	30	30	30	29	30
Poseideon II. (in leap years).....			30		29			30			30		30			29			29
Gamelion.....	29	30	29	30	30	29	29	29	30	29	29	29	29	30	29	30	29	30	30
Anthesterion.....	30	29	30	29	29	30	30	30	29	30	30	30	30	29	30	30	30	29	29
Elaphebolion.....	29	30	30	30	30	29	30	29	30	29	29	29	29	30	29	29	29	30	30
Munychion.....	30	29	29	29	29	30	29	30	29	30	30	30	30	29	30	30	30	29	29
Thargelion.....	29	30	30	30	29	29	30	29	30	29	29	30	29	30	29	29	29	30	30
Sciorphorion.....	30	29	29	29	30	30	29	30	29	30	30	29	30	29	30	30	30	29	29
Number of days in a year.....	355	354	384	354	384	355	354	384	354	355	384	354	384	354	355	384	354	354	384

METON'YMY (Gr. *metonymia*, signifying a change of name) is a figure of speech by which one thing is put for another to which it bears an important relation, as a part for the whole, the effect for the cause, the abstract for the concrete, etc. For example, "*Lying lips* are an abomination to the Lord." This figure is very expressive, and is much used in proverbial and other pithy modes of speech.

MET'OPE, the space, in the frieze of the Doric order, between the triglyphs—generally ornamented with figures, or bulls' heads, or pateræ.

MET'RA, an ingenious pocket-instrument, invented by Mr. Herbert Mackworth about 1858. It combines the thermometer, climometer, goniometer, anemometer, level, plummet, scales, etc., so that, by its assistance, travelers or engineers can at once record their observations. It enables us to determine the dip of rocks, angles of crystals, temperature, rate of wind, to take levels of large surfaces, determine latitude, and a variety of other matters connected with physical science. As a pocket-instrument it is of great value.

METRIC SYSTEM (Meter, *ante*). The modern or decimal system of measurement takes name from its unit, the meter. It should be understood that all Indo-European nations originally counted by twelves. They were exposed to the influence of Ur-altaic

races, who seem to have preferred threes and sixes. From the Egyptians they borrowed the count by tens, and from Shemites periods of sevens, and the double-ten or score. All these systems, complicated with varying units as bases, may be traced in the tables of measurement of modern Europe. Besides, although the value of place in notation was known to the Babylonians—and, in fact, it is not easy to write mixed measurement without assuming it—the general use of decimal notation in Europe dates only from the renaissance. Common measurements, then, do not agree with our notation, and the metric system does. It is not in itself best fitted for treating a universal unit, because it neither divides nor cubes as well as a series of doublings—the binary system. As, for instance,

1	32
2	64..... $= 8^2$.... $= 4^3$
4..... $= 2^2$	128.....
8..... $=2^3$	256..... $= 16^2$
16..... $= 4^2$	512..... $= 8^3$ etc., etc.,

or a count by eights, thus:

Units.	Oktads.	16ads.
1	$8 = 2^3$	$64 = 8^2$ and 4^3
2	$16 = 4^2$	128
3	24	192
$4 = 2^2$	32	$256 = 16^2$
5	40	320
6	48	384
7	56	448 etc., etc.,

when $64 = 4^3$ and 8^2 is written $100 = 4^3$ and 10^2, and $256 = 16^2$ is written $400 = 20^2$. But the binary system is open to the slight objection that it takes eight naughts to express 512, and oktads are evidently more cumbrous than dekads. A system of dodekads would match our multiplication table, correspond better with the traditions of our race, and have the inestimable advantage of possessing 6 and 3 as factors, without which the circle, geometrically considered, can hardly be grappled with. The meter is neither a part of an ascertainable distance nor the true portion of that distance as ascertained; the English yard, 39.13929 in., or the length of a pendulum vibrating seconds of mean time in vacuo, at the latitude of London and the level of the sea, being much more easily and surely measured. The advantages of the metric system are that it is a settled measure, in use by more people than any one other, and that its divisions correspond with what must always remain the notation of the educated world. It was made compulsory in France in 1840, legal in England in 1864, and in the United States by act of July 28, 1866. Its friends have as yet failed to render it acceptable to the nation, and apparently from misconception of the wants and prejudices of the populace. They have not decided upon any neat or consistent way of expressing its abbreviations, so that draftsmen and printers are either unwilling or unable to use them. They have neglected to make for workmen comparative tables giving its equivalents in the measures daily in use by them, and they have never succeeded in giving to the public a few brief rules for interchanging quantities, not necessarily exact, but near enough for hourly use. It is plain that a sudden change in the whole system of measures of a country involves loss of time with perplexity and expense. The advantages of a decimal notation may be shown by retaining some known unit and the popular names, but with change of other divisions: as an English foot, but of 10 in. and running 10 to the pole, etc., very much like the temporary change by the Swiss confederation; or by fixing upon some point which nearly coincides, changing that by legislation to an exact part of the right system, and leaving to time the gradual displacement of the more cumbrous. Thus the addition to an English inch in a yard made equal to a meter is easily made allowance for by tradesmen and workmen on a scale of the present pattern. This seems to account for the failure of the French law of Feb. 11, 1812.

The unit of the system is the METER, one ten-millionth of the calculated distance from the pole to the equator. See CHEMISTRY, *ante* (diagram). By prefixing the Greek words *deka*, *hekto*, *kilo*, and *myria* for multiples, and the Latin *deci*, *centi*, and *milli* for divisionals, there results a series of terms, each increasing by a power of ten. The LITER, or cubic decimeter, of water furnishes a standard for capacity, and a subdivision of it, the GRAM, or cubic centimeter, for weight. We have, then, five kinds of measures, of length, surface, volume, capacity, weight, and (but not carried out) money. It must be noticed that the French law supposes a double and a half to each measure; that many of the divisions have not been adopted in common use; and that certain modifications based on a larger unit have been found convenient in practical and scientific use. One advantage of the decimal system is that when speaking, say of kilom. for distance, or milligr. for weight, we may write 19.736 kilom., or 113.26 milligr., that is without treating them from the scale of meters or liters.

MEASURES OF LENGTH.

Myriameter.....	myriam.	=	10,000	m.	= 6.2137 miles.
Kilometer.....	kilom.	=	1,000	"	= 3,280 ft. 10 in..

Hektometer.....	hektom.	=	100	"	=	328 ft. 1 in.
Dekameter.....	dekam.	=	10	"	=	32 ft. 9.7 in.
METER.....	m.	=	1	"	=	39.3707904 in.
Decimeter.....	decim.	=	0.1	"	=	3.937 in.
Centimeter.....	centim.	=	0.01	"	=	0.3937 in.
Millimeter.....	millim.	=	0.001	"	=	0.0394 in.

Surveyors' chains are a dekam., a double or a half dekam. in length. The cable-length is 200 m.

MEASURES OF SURFACE.

Superficial.

SQUARE METER.....	sq. m.	= 1.	sq. m.	=	1,550 sq. in.
Square decimeter.....	sq. decim.	= 0.01	"		or
Square centimeter.....	sq. centim.	= 0.000,1	"		10.747 sq. ft.
Square millimeter.....	sq. millim.	= 0.000,001	"		

Note that the sq. decim. is not the tenth of a sq. m., but the square of a tenth, a hundredth. It follows that the decimals are read by pairs; thus, 3.532 sq. m. is read 3 sq. m., 53 sq. decim., 20 sq. centim., etc., etc.

Topographic.

Square myriameter,	sq. myriam.	= 100,000,000 sq. m.	
Square kilometer,	sq. kilom.	= 1,000,000 "	= 0.385496 sq. miles.
Square hektometer,	sq. hektom.	= 10,000 "	
Square dekameter,	sq. dekam.	= 100 "	

Agrarian.

Hektare.....	hekta.	=	10,000 sq. m.	=	2.471 acres.
ARE.....	a.	=	100 "	=	119.6 sq. yds.
Centiare.....	centia.	=	1 "	=	1150 sq. in.

Myriameters and myriares are used only in geographical or statistical works, and the hektare, like our acre, is the general unit in speaking of farm-land. While the sides of the measures differ by tens, their surfaces differ by hundreds. There are no such terms as decare, kilare, deciare, and milliare, for they are not squares of any multiple of ten.

MEASURES OF VOLUME.

Cubic Measure.

CUBIC METER....	cu. m.	= 1.	cu. m.	=	35.31481 cu. ft.
Cubic decimeter...	cu. decim.	= 0.001	"		
Cubic centimeter..	cu. centim.	= 0.000,001	"		
Cubic millimeter..	cu. millim.	= 0.000,000,001	"		

As before, the tenth of a cubic meter must not be confounded with the cubic decim.; the first is contained ten, the second a thousand times in a cu. m. Decimals must therefore be read by threes; thus, 5.427,93 cu. m. must be read 5 cu. m., 427 cu. decim., 930 cu. centim., etc.

MEASURES FOR FIRE-WOOD.

Dekastere.....	dekast.	=	10.	st.	
STERE.....	st.	=	1.	" or cu. m.	= 1.308 cu. yds.
Decistere.....	decist.	=	0.1	st.	

Note that the decist. is equal to one-tenth of a st., or cu. m., and is not to be confounded with cu. decim.

MEASURES OF CAPACITY.

Unit, the *liter*, equivalent to one cubic decimeter.

			Dry Measure.	Wine Measure.
Myrialiter.....	myrial.	=		
Kiloliter.....	kilol.	=		264.17 galls.
Hektoliter.....	hektol.	=	2 bu. 3.35 pk.	
Dekaliter.....	dekal.	=	9.08 quarts.	
LITER.....	l.	=	0.908 "	1.0567 quarts.
Deciliter.....	decil.	=	6.1022 cu. in.	0.845 gills.
Centiliter.....	centil.	=		0.338 fl. oz.
Milliliter.....	millil.	=		0.27 fl. dr.

The myrial. and kilol. are seldom used; but for grains, potatoes, seeds, as well as alcohol, wine, and oil, the hektol. is in general use. The liter is used as we use both gallon and bushel. The kilol. is a cu. m., the hektol. its tenth part, and the liter a thousandth.

MEASURES OF WEIGHT.

Unit, the *gram*, weight of a cu. centim. of distilled water, at the temperature of melting ice, 4° C., in the latitude of Paris, in vacuo, and altitude reduced to sea-level.

Metric ton	met. ton	=	2,204.6	lbs. avoir.
Metric quintal	met. quint.			
Kilogram	kilo.	=	2.2046	" "
Hektogram	hektogr.	=	3.5207	oz. "
Dekagram	dekagr.			
GRAM	g.	=	15.432	gr. "
Decigram	decigr.			
Centigram	centigr.			
Milligram	milligr.	=	0.0154	" "

The kilo. is the weight of a cu. decim. of water, or a liter. The met. ton is therefore that of a cu. m. of water.

The application of the metric system to coins has not yet been adopted, to the exclusion of any other, by any nation. The republics and the minor kingdoms have a more or less perfect series.

The division of the circle into 100° never was a success, and for reasons already noted. It has been proposed to substitute 600°, or six sextants of 100° each. But, if any change be advisable 120° seems preferable, being handily small, and divisible by 2, 3, 4, 5, 6, 8, and 10.

The thermometer of Celsius, or the centigrade (100°), has 0° at freezing, 32°, and 100° at boiling water, 212°, of the Fahrenheit. It is translated into Fahrenheit, F., or Réaumur, R., by the formula:

$$C = \frac{5}{9}(F - 32) \text{ or } \frac{5}{4}R.$$

The Wedgwood pyrometer, W., has its 0° at 580.56° C., and each degree of W. = 72.22° C.

The measure of work is the kilogrammeter, or 1 kilo. raised 1 m. high in 1 second, or 7.233 f. lbs., and a horse-power equals 75.73 kilogmet. It has been proposed to substitute tonmeters, when 1 h.p. = 13.47 tonmet. The atmospheric pressure is reckoned at 1.033 kilo. to the sq. centim. The following approximate rules are useful for every-day necessities. As there are 96 eighths to one foot, a drawing to the scale of

$\frac{1}{8}'' = 1'$ is equiv. to 1 centim. = 1 m. nearly.
$3'' = 1'$ " " " 2.5 decim. = 1 m., etc.

Five miles = 8 kilom., and a little more.
The meter is 3 ft. 3 in. $\frac{3}{8}''$, nearly.
The decim. is 4 in., slack.
The centim. is $\frac{3}{8}''$, full.
The sq. meter is $10\frac{1}{2}$ sq. ft., and more.
The sq. mile contains nearly 3 sq. kilom., and the sq. kilom. is 247 acres.
The hekt. is nearly $2\frac{1}{2}$ acres.
The are is a rood, nearly.
Three cu. yds. contain nearly 4 cu. m.
One cu. m., or st., equals $\frac{7}{8}$ of a ton of coal, of 40 cu. ft., which is also the U. S. shipping ton, or 33 U. S. bushels; and 2 cords of wood contain a little more than 7 steres.
The liter is a quart, both dry and wine measure (nearly 6 of our so-called quart bottles to 4 liters).
Four and a half l. to the gallon, imperial.
A new 5 cent nickel weighs 5 grams.
Fifteen grams of letter-weight are called $\frac{1}{2}$ oz. avoir.
The kilo. is 2 pounds, full.
The met. ton is the old big ton.
One horse-power, 33,000 foot-pounds, is 75 kilogmets.
Mechanical equiv. of heat, 772 f. lbs., is 425 kilogmets.

MET'RONOME, a valuable small machine for indicating the correct time or speed at which a musical composition should be played. It was invented in 1815 by Mälzel, the inventor also of the automaton trumpeter. See AUTOMATON. The test of a correct metronome is, that when set at 60 it shall beat seconds.

METROPOLIS, a city in Illinois, on the n. bank of the Ohio river; pop., '70, 2,490. It is 38 m. e. of Cairo, and 11 m. above Paducah. Its streets are regularly laid out, of a uniform width, and it is built on a high bluff, which slopes gradually toward the river; the lowest line being above high-water mark in the greatest floods. It has a bank, 8 churches, and 2 newspapers. The principal manufactories are potteries and tobacco factories. Lumber is manufactured; it has 2 ship-yards and several flour-mills.

METROP'OLIS LOCAL MANAGEMENT ACT. The metropolis of the United Kingdom, owing to its immense size, has been regulated for ædile and sanitary purposes

chiefly by special acts, one of which is called the metropolis local management act. It had long been subject to a special building act, which laid down minute regulations as to the formation of streets, alteration and building of houses; and the metropolis buildings act still contains a code applicable to building regulations, the chief principle of which is, that no person can build or make alterations till they have been duly approved by the inspectors, whose duty it is to see that certain conditions have been complied with as regards the public safety. In 1855 a great change was made in the internal economy of the metropolis by the metropolis local management act, which created the metropolitan board of works, and provided it with extensive powers of drainage, sewerage, lighting, cleaning, removing nuisances, and general improvements, and with powers also to rate the occupiers of houses for the expenses of the general management. Formerly, each vestry did what it thought proper within its own parish, and there was no uniformity observed in the details of management. But the above act contained a code of laws affecting numerous details of street and city life. One important function was the systematic construction of sewers and the removal of nuisances. No new building is now allowed to be built without sufficient drains and water-closets. Paving is enforced in most cases.

METROPOLITAN, in church law, the bishop of a *metropolis*, or "mother city," upon which other episcopal cities are in some sense dependent. The gradations of the hierarchy, on which this dependence is founded, are of very early origin, and may, it is alleged, be traced, at least in germ, in the letters of St. Paul to Timothy and to Titus. The commentaries of the Fathers (as Chrysostom, 15 *Hom. in* 1 *Tim.*, and Eusebius, *Hist. Eccles.* l, iii. c. iv.) recognize it as of apostolic institution. The jurisdiction of metropolitans, according to the ancient law of the church, was very considerable, and extended over all the bishops of that province of which the metropolitan see was the capital. It was their privilege not only to summon and preside over provincial councils, to consecrate the provincial bishops, but also to decide certain causes, and in other ways to exercise authority within the sees of their suffragans. Recent canons have very much restricted their powers. The metropolitan is distinguished from an ordinary archbishop by his having suffragan bishops subject to him, which is not necessarily the case of an archbishop.

In the church of England the archbishops of Canterbury and York are metropolitans, and in the Protestant Episcopal church of Ireland, those of Armagh and Dublin. In the newly constituted hierarchy of the Roman Catholic church in England, the archbishop of Westminster has the rank of metropolitan. In the Roman Catholic church of Ireland, the archbishops of Armagh, Dublin, Cashel and Tuam all possess the same rank.

METTERNICH, Clemens Wenzel Nepomuk Lothar, Prince von Metternich, and duke of Pontella, an eminent Austrian diplomatist and statesman, was b. at Coblenz, May 15, 1773. His father, Franz Georg Karl, count von Metternich, was also an Austrian diplomatist, and an associate of Kaunitz. He represented a very ancient and distinguished family, whose original seat was in Jülich. Young Metternich was educated at the university of Strasburg, and afterwards studied law at Mainz and traveled in England. In 1795 he married the granddaughter and heiress of the celebrated minister Kaunitz, by whom he acquired large estates. His diplomatic career commenced at the congress of Rastadt, which he attended as representative of the Westphalian counts. His rise was very rapid: he added to the advantages of his birth and connections, a more than ordinary share of diplomatic ability, with the most graceful and winning manners. In 1801 he became Austrian ambassador at Dresden; and on the outbreaking of the third coalition war, he negotiated the treaty of alliance between Austria, Prussia, and Russia. In 1806 he went as ambassador to Paris, and concluded, in 1807, the treaty of Fontainebleau, very favorable to the interests of Austria; but on the outbreaking of the war between France and Austria in 1809, he was detained some time ere he could obtain his passport. In course of that year, he succeeded count von Stadion as minister of foreign affairs, concluded the treaty of peace with the French minister Champagny, and accompanied the empress Maria Louisa to Paris. He guided the course of Austria amidst the difficulties of 1812–13. He maintained at first a temporizing policy and a scheme of an armed mediation of Austria; but the obstinacy of Napoleon reduced him to the necessity of adopting at last a decided step, and led him to resolve upon that declaration of war by Austria against France, which took place in Aug., 1813, and he subsequently conducted with great ability the negotiations which ended in the completion of the quadruple alliance. On the eve of the battle of Leipzic, the emperor of Austria bestowed upon him the princely dignity. He was afterwards employed in almost all the chief diplomatic affairs of that eventful time; and after the congress of Chatillon and negotiations with the count d'Artois, he went to Paris, and signed the convention of Fontainebleau with Napoleon, went to England to negotiate concerning a new quadruple alliance, and attended the congress of Vienna, of which he was unanimously elected president. He signed, as Austrian plenipotentiary, the second peace of Paris Nov. 20, 1815. After this, he continued still to conduct the diplomacy of Austria, and in 1821 was appointed chancellor (*Haus-, Hof und Staatskanzler*), and in 1826 succeeded count Zichy in the presidency of ministerial conferences on home affairs. His efforts

were now earnestly directed to the maintneence of peace in Europe, and the preservation of the existing state of things in the Austrian dominions by the strictest measures of police and severe despotism. The revolutionary movement of 1848 breaking forth with sudden violence, caused the aged minister to flee from Austria, and to seek refuge in England; nor did he return to Vienna till the end of 1851, when he received great marks of honor and favor from the emperor; but although sometimes consulted, he was never again asked to undertake the cares of office. He died at Vienna, June 11, 1859. The general opinion respecting Metternich has been well expressed by the *Times* newspaper: "He was renowned rather than great, clever rather than wise, venerated more for his age than his power, admired but not lamented." His son Richard became ambassador at the court of Napoleon III. after the peace of Villafranca.

METTRAY. The reformatory of Mettray is the true parent of all institutions intended to reform and restore to society, and not merely to punish, juvenile delinquents. Mettray Demetz, a member of the Parisian bar, struck with the evils and hardship attending the committal to prison of young, and, considering their training and habits, scarcely responsible criminals, there to languish hopelessly for a time, and then to emerge worse than when they entered, resolved, in conjunction with the Vicomte Bretignères de Courteilles, to found a school which should have for its object the reformation of this class of offenders. In 1839 accordingly, the reformatory, or, as it is called, the colony of Mettray, was set on foot, about 5 m. from the city of Tours in France. Thus M. Demetz, by his assiduous labors and self-devotedness, rendered to France and Europe one of the greatest benefits that could be conferred on society, by proving that, by agricultural and other labors of industry, and well-considered rules of organization and discipline, the neglected and criminal may be trained to take their place honestly and honorably in society. The children consist wholly of orphans, foundlings, and delinquents, and, in 1872, amounted in number to 792. From the foundation up to that date, 4,287 had been received. The relapses into crime of those who had left the colony amounted only to about 4 per cent. The success of this establishment is to be attributed not solely to the excellent training and close supervision at Mettray itself, but to the care which is taken to preserve the link between the authorities and those who have left the colony. A small payment is made by the state for children sent under judicial sentence; the large extra expenditure necessarily incurred being defrayed from charitable contributions from the individuals constituting the "paternal society of Mettray."

METZ, the strongest fortress of the German imperial territory of Alsace-Lorraine, and capital of the district of Lorraine; before 1871, the main bulwark of France in her north-eastern frontier, and capital of the department of Moselle. It is situated on the Moselle at its confluence with the Seille. The strength of Metz consists in its exterior defenses, of which the principal are 11 forts, partly strengthened and improved since the German occupation, and partly entirely new. The city contains many important institutions, barracks, hospital, military schools, and arsenals. The cathedral, a Gothic edifice, begun in 1014, and finished in 1546, is remarkable for its boldness, lightness, and elegance, and has a beautiful spire of open work, 373 ft. in height. The industry of Metz is active; there is a good trade in wine, brandy, indigo, glass; and there are several cloth manufactories in the neighborhood. The pop. of Metz, which in 1869 was 48,325, had in 1875, by reason of emigration into France, decreased to 37,925, or with garrison, 45,856.

Metz, known to the Romans as *Divodurum*, was afterwards called Mettis (corrupted from Mediomatrici, the name of the people), and hence the present form. Under the Franks, Metz was the capital of Austrasia (q.v.). At the division of Charlemagne's empire, Metz, with the rest of Lorraine (q.v.), fell to Germany, and was afterwards made a free city of the empire. In 1552 it was treacherously taken possession of by the French; and although Charles V. besieged the place from October, 1552, to January, 1553, they kept it till it was formally ceded to them in 1648. In August, 1870, Bazaine was compelled to retire into Metz with his army; and after an investment of 70 days, during which no attempt was made to take the city by force (not even a single shell having been fired into it), Europe was startled to hear of the capitulation of Metz, by which 180,000 men and immense military stores fell into German hands (Oct. 27, 1870). By the treaty of Frankfort, Metz was annexed to Germany as part of Lorraine.

METZU, GABRIEL, 1615–67; was b. at Leyden, in s. Holland. Little is known of his early life, and from what artist he acquired his education in the rudiments of painting is unknown. He was, however, still young when already possessed of a high reputation at Amsterdam. As a painter he belonged to the Dutch school, and was essentially a materialist in art. Although he painted a few portraits, most of his subjects were taken from commonplace scenes of middle-class or humble domestic life. Of imagination or high artistic conception he had but a small share; but in minuteness of detail, in perfection of coloring and execution, he was very remarkable. His subjects were such as morning visits, musical parties, ladies at their toilet, a cavalier smoking and drinking at a cabaret; in short, he was a *genre* painter, and in exact reproduction of scenes of familiar life stands very high. His work commands a great price, and many excellent specimens are to be found in the *Louvre* and the other principal art-galleries of Europe.

It has been asserted that Metzu died in 1658, but one of his best and undoubtedly genuine works bears date 1667.

MEUDON, a t. of France, in the dep. of Seine-et-Oise, 5 m. w. of Paris, on the Versailles and Paris railway. The château, approached by a fine avenue of four rows of lime-trees, was built by the side of an older château, the work of Philibert Delorme, by the grand dauphin, son of Louis XIV., in 1699. During the revolution it was converted into a factory for warlike engines, and surrounded with a permanent camp to keep out spies. The château, as it exists at present, was fitted up for Marie Louise by Napoleon in 1812. It has a fine terrace, gardens beautifully laid out, and commands a very fine prospect. The Forêt de Meudon is a favorite holiday resort of the Parisians. Near it has been erected an expiatory chapel, dedicated to Notre Dame des Flammes, marking the spot where a terrible railway accident occurred in May, 1842, in which more than 100 persons were burned alive. Whiting is manufactured to a considerable extent, and there are numerous bleachfields. Rabelais was curé of Meudon for a long time. The château was for many years a favorite summer residence of Prince Napoleon. Pop. '76, 6,385.

MEU'LEBEKE, a t. of Belgium, in the province of West Flanders, 20 m. s.w. of Ghent, on the Mandel, a tributary of the Lys. Weaving is carried on, and there are several breweries. It is near a railway, which connects it with Bruges and other places. Pop. 8,300.

MEURSIUS, or DE MEURS, JOHANNES, 1579–1639; b. Belgium; educated at Leyden, where he became famous for his classical attainments. At the age of 12 he wrote orations in Latin, at 13 he composed Greek verses, and at 16 he had finished a commentary on Lycophron, the most difficult Greek author. On leaving the university he became tutor to the sons of John of Barneveldt, the grand pensionary, and traveled with them through Europe. He continued his studies on the continent, and the university of Orleans recognized his great learning by conferring upon him the degree of LL.D. He returned to Holland in 1610, and became professor of history in the academy of Leyden, and the next year was transferred to the chair of Greek. He was made historiographer to the states of Holland, and enjoyed a high degree of favor, till the execution of Barneveldt, his known intimacy with whom exposed him to considerable persecution. He was offered and accepted, in 1625, from the king of Denmark, the professorship of history in the university of Sora, and the position of royal historiographer, and he remained at Sora till his death. His published works are 67 in number; they include editions of many Greek authors, such as Lycophron, Procopius, Porphyry, and Aristoxenes; treatises on Greek and Roman antiquities; and a *Glossarium Græco-Barbarum*, still a standard work on the Greeks of the lower empire.

MEURTHE, formerly a department in the n.e. of France, immediately s. of the former department of Moselle. The area was about 2,254 sq.m.; pop. '66, 428,387. Its surface is undulating and picturesque; while along the eastern border run the Vosges mountains, rising in one point to 1148 ft. in height. The chief rivers are the Moselle, and its affluents the Meurthe, the Madon, the Seille, etc. This district is no less remarkable for the beauty of its scenery than for the fertility of its soil and the variety of its productions. After the treaty of Frankfort, by which part of Meurthe was ceded to Germany, the rest of Meurthe, together with the small part of the department of Moselle that remained to France, was formed into a new department under the name MEURTHE-ET-MOSELLE; area, 2,015 sq.m.; pop. '76, 404,609. Arrondissements: Nancy, Lunéville, Toul (from Meurthe), and Briey (from Moselle); capital, Nancy.

MEUSE, a river of northern Europe, rising in the department of *Haute Marne* in France, flowing northerly through the departments of Vosges, Meuse, and Ardennes, traversing the mountainous region of the "forest of Ardennes," entering Belgium at Namur, where it is joined by the Sambre from the w.; thence runs n.e. past Liége, where it receives the Ouerthe, forms a part of the boundary between Belgium and Holland, passes Maestricht and Roermond, and receives the Roer. At Bommel it almost joins the Rhine, and finally mingles its waters by two channels with the Waal, one of the mouths of the Rhine, the easterly channel reaching Rotterdam, and afterwards being joined by the other, when both empty into the North sea. Their delta forms extensive shoals and quicksands. The river is 580 m. long, and can be navigated 460 miles. Canals in Holland and Belgium connect it with their other rivers.

MEUSE, a frontier department in the n.e. of France. Area, 2,400 sq.m.; pop. '76, 294,054. The surface is traversed from s.e. to n.w. by two parallel ranges of hills, which form the right and left bank of the river Meuse (see MAAS), and separate it from the basin of the Seine on the w., and from that of the Moselle on the east. The Meuse, the Ornain, and the Aire are the chief rivers. The soil is generally poor, except in the valleys of the principal rivers, which are remarkably fertile and well cultivated. The usual crops are raised in average quantities. Twenty-two million gallons of wine (red and white) are made annually. The four arrondissements are Bar-le-Duc, Commercy, Montmédy, and Verdun. The capital is Bar-le-Duc.

MEW, or SEA MEW, the English name for the common European gull (*larus canus*) and other small gulls.

MEXICO constitutes the south-west extremity of North America, and occupies a portion of the isthmus which connects the latter with the s. part of the American continent. It is bounded on the n. by the territories of the United States, on the w. by the Pacific ocean, on the s. by the Pacific and Central America, and on the e. by the gulf of Mexico. The area of Mexico is about 750,000 sq.m., and the pop. (1878) about 9,340,000. In 1861 the 8,000,000 inhabitants were thus distributed amongst the various races: Indians, 4,800,000; whites, 1,004,000; half-breeds, 1,190,000; negroes, 6,000. The following table gives the names of the provinces and their chief towns, with the populations for 1869:

States.	Pop. in 1869.	Chief Towns.	Population.
Aguas Calientes	140,630	Aguas Calientes	22,534
Campeachy	80,366	Campeachy	15,196
Chiapas	193,187	San Cristobal	10,475
Chihuahua	179,971	Chihuahua	12,000
Coahuila	95,397	Saltillo	8,105
Colima	63,333	Colima	31,000
Durango	185,077	Durango	12,449
Guanajuato	874,043	Guanajuato	63,000
Guerrero	300,029	Tixtla	6,501
Hidalgo	404,207	Pachuca	12,000
Ialisco	924,580	Guadalajara	70,000
Mexico	650,633	Toluca	12,000
Michoacan	618,240	Morelia	25,000
Morelos	150,384	Cuernavaca	.....
Nuevo Leon	174,000	Monterey	13,500
Oajaca	646,725	Oajaca	25,000
Puebla	697,788	Puebla	75,500
Queretaro	153,286	Queretaro	47,570
San Luis Potosi	477,500	San Luis Potosi	33,581
Sinaloa	163,095	Culiacan	10,000
Sonora	109,388	Ures	7,000
Tabasco	83,707	San Juan Bautista	6,000
Tamaulipas	108,778	Ciudad Victoria	6,164
Tlaxcala	121,665	Tlaxcala	4,000
Vera Cruz	459,262	Vera Cruz	10,000
Yucatan	422,365	Merïda	23,500
Zacatecas	397,945	Zacatecas	31,000
Federal District	275,996	Mexico	200,000
California	21,645	La Paz	500

Physical Character, etc.—The great mass of the Mexican territory consists of an elevated plateau, formed by an expansion of the Cordilleras of Central America (q.v.), from which terraced slopes descend with a more or less rapid inclination towards the Atlantic on the e. and the Pacific on the west. This vast tract, which extends from 18° to 32° n. lat., and from 95° to 115° w. long., comprises one of the richest and most varied zones in the world; for while its geographical position secures to it a tropical vegetation, the rapid differences of elevation which characterize it afford it the advantages of temperate climates, in which all the varieties of our European flora and fauna can come to perfection; and it thus combines within its limits an almost unparalleled exuberance and multiplicity of natural products. The table-lands of Mexico lie at elevations varying from 5,000 to more than 9,000 ft. above the level of the sea, and exhibit great differences of level and varieties of soil. They generally incline northward, and are for the most part girt in by low mountain chains, among which rise individual lofty peaks, as Coffre de Perote (13,400 ft.), Orizava (17,370 ft.), and others; while they are intersected by higher ranges, above which tower a few cones, as Istaccihuatl, the white woman (15,700 ft.), and the volcano of Popocatapetl, or the smoking mountain (17,880 feet). These volcanoes and several others of less note, lying within the parallels of 18° 15′ and 19° 30′ n. lat., form a transverse volcanic band between the two oceans, and do not follow the inclination of the central chain, as is the case in the volcanoes of South America. Volcanoes also occur isolated, as, for instance, in the plain of Mixtecapan, 2,900 ft. above the sea, where, in 1759, the volcano of Jorullo, which still emits smoke, was formed after an eruption, by which a surface of many square miles was raised several feet above the level of the plain; in fact, every part of the Mexican territory betrays the volcanic nature of its formation, although neither earthquakes nor any other active phenomena have of late been of frequent occurrence. The principal chain, intersecting the table-land, is the Sierra Madre, or Tepe Suene, in which lie the chief gold and silver mines, and which, after traversing the states of Queretaro and Guanajuato, divides into three main branches, the central of which forms the water-shed between the Pacific ocean and the gulf of Mexico. In addition to these great chains, the Mexican territory is intersected by numerous lesser ranges, which on the Pacific side break up the terraced declivities into innumerable deeply cleft valleys, which assume almost the character of steep ravines near their junction with the narrow littoral plains of the Pacific ocean. Violent storms rage on this coast, blowing from the south-west during the hot months, when the climate is as prejudicial to whites as on the Mexican gulf, although it is not visited by the yellow-fever. Mexico may be said to be generally deficient in navigable rivers; for although some of the largest have a course of more than 1000 miles, few are free from rapids. The Rio Santiago, or Rio Grande, with a course of 500 m., is

broken near Guadalajara by 60 falls in the space of less than three miles; the Rio Grande del Norte, which forms in its lower course the boundary between Mexico and the United States, has a winding course of nearly 1800 m., but it is only navigable for small sailing vessels to Matamoras, 60 m. from its mouth, where a bar and numerous shoals prevent the passage of large vessels. A similar remark applies to the majority of the rivers which fall into the gulf of Mexico. The eastern coast generally presents great obstacles to navigation, as it is low and sandy, unbroken by bays or inlets, and lined by sandbanks several miles in width; the only points of access being the mouths of rivers, which are not good roadsteads, as with few exceptions, the rivers have little water, except at the rainy season, which generally sets in about June, accompanied by overpowering heat, during the prevalence of which the yellow-fever, or *vomito prieto*, rages like a pest in all the low lands. Mexico is on the whole badly supplied with water; and since the Spaniards have discontinued the system of irrigation, which was followed by the Aztec races with so much success, many tracts have become barren, and unsuited for the purpose of human occupation. A great portion of the table-lands can only be used for pasture. Springs are rare, and many of the rivers flow in deep mountain beds, without receiving smaller tributaries, while the rapid evaporation on a light soil, covering porous rocks, leaves the surface dry and hot, and unable to support any vegetation, beyond the cactus and some low grasses. The plains, moreover, contain the beds of numerous dry salt lakes, but this is chiefly the case on the north and east of the table-land. The western parts of the plateaux between 100° and 102° w. long. (known as the Baxio), yield, by careful irrigation, rich crops of maize and wheat, and rank among the most fertile agricultural districts of Mexico. They are, however, here and there interrupted by sterile tracts, either covered by stones, and then known as "pedegral," or with lava, when they are characterized as a *mal pais* (bad country). In contrast with these unprofitable districts, the plains are occasionally broken by depressions of the soil, known as *barrancas*, descending sometimes 1000 ft., and measuring several miles across, which are covered with a luxuriant vegetation of trees and shrubs, and watered by small streams running through the middle of the valley. Mexico has numerous lakes, but few of any importance; that of Chapala in Jalisco is one of the most considerable, being more than 90 m. long.

Climate, Products.—The differences of climate, depending upon the different degrees of altitude, are so great in Mexico that the vegetable products of this vast country include almost all that are to be found between the equator and the polar circle. In the course of a few hours, the traveler may experience every gradation of climate, embracing torrid heat and glacial cold, and pass through different zones of vegetation, including wheat and the sugar-cane, the ash and the palm, apples, olives, and guavas. The Spaniards, on their first occupation of Mexico, distinguished its great climatic divisions under the characteristic names, which are still retained, of the *tierras calientes* (hot or littoral lands), *tierras templadas* (temperate lands), and *tierras frias* (cold or high lands). The mean annual heat of the tierras calientes is 77°; and the soil, which is generally fertile, produces maize, rice where water can be procured for irrigation, bananas, pine-apples, oranges, manioc; and sarsaparilla, jalap, and vanilla in the littoral swampy forests. This tract has only two seasons—the winter, or season of north winds, and the summer, or season of breezes. In the former, the hurricanes are the terror of navigators, but the coast is clear of yellow-fever, which prevails in the hot season. On the medium elevations of the tierras templadas, the temperature is extremely equable, varying only from about 70° to 80° F.; the climate healthy, and wherever water is abundant, a perpetual summer reigns, yielding a varied and active vegetation, which embraces all the cereals, fruits, and vegetables of central and southern Europe, amongst which maize, oranges, lemons, grapes, and olives are produced in the most exuberant abundance. The tierras frias, which would scarcely have been characterized as cold by discoverers belonging to a less southern climate than Spain, possess a generally temperate climate, the mean annual heat ranging between 66° and 68° F.; but on the highest of the table-lands, the air is keener, and the soil more arid, and agriculture is limited to the cultivation of barley and of the agave, or Mexican aloe, which held the place of the vine among the ancient Aztecs, and is still extensively cultivated for the sake of its juice, which is made into the fermented drink known under the name of *pulque*. In addition to the vegetable products already referred to, Mexico yields coffee, tobacco—whose growth is, however, limited by governmental restrictions—yams, capsicums, pepper, pimento, indigo, ipecacuanha, dragon's-blood, copaiva, fan-palms, india-rubber trees, mahogany, rosewood, ebony, etc.

The products of the mines, which rank among the richest in the world, include the precious metals. The gold mines of Mexico occur principally on the w. side of the Sierra Madre, n. of 24° n. lat., and, until the discovery of the metal in Australia, their yield surpassed the produce of any other part of the world. Silver mines abound in Mexico, and the argentiferous veins, which may be said to intersect every part of the western declivities of the Andes, occur in some places, as in the *Vela Madre* lode at Guanajuato, in beds varying from 10 to 50 yards in depth; the precious metal being in these cases intermixed with sulphur compounds, antimony, and arsenic. But although these mines possess the additional special advantage of being situated in fertile districts, affording abundant food to miners and their cattle, their working has been very imper-

fectly carried on, owing to the unsettled state of the country. At the close of the last, and the beginning of the present century, the annual value of the gold and silver of Mexico was upwards of £6,000,000, of which nine-tenths were yielded by the silver; but the political disturbances, preceding and consequent on the wars of independence, have very considerably reduced this sum, which has probably never been reached since Mexico was finally separated from the mother-country. In addition to gold and silver, Mexico yields tin, antimony, mercury, copper, lead, iron, and zinc; while carbonate of soda, used in smelting silver, is found crystallized on the surface of several lakes, and occurs, together with common salt, in dry seasons, on the more arid parts of the surface of the elevated table-lands.

Cattle, horses, asses, mules, and sheep abound in Mexico, where, in consequence of the extent and excellence of the pasture-grounds, all the domestic animals introduced from the old world have multiplied excessively. Buffaloes feed in the lower plains; goats and sheep are plentiful; the tapir, wolf, American lynx, jaguar, wild cat, several species of the skunk, the brown porcupine, stag, deer, etc., are to be found. Parrots, humming-birds, and wild game birds, including turkeys, are abundant; and almost all the lakes yield large quantities of fish. The cochineal insect and the silk-worm are reared with great success on the table-land of Mixtecapan.

Commerce, etc.—Notwithstanding the enormous advantages presented by her natural productions, and the important geographical position which she occupies between the Atlantic and the Pacific, Mexico, owing to her unsettled government, and the consequent insecurity of life and property, has not been able to develop her foreign commerce beyond the value of about £10,000,000. The precious metals constitute, it is estimated, nearly nine-tenths of the exports, the remainder being made up by productions of the soil, and industrial products, such as cotton, woolen and silk goods, soap, leather, saddlery, gold and silver lace, cigars, brandy, etc. England, France, Hamburg, and Lubeck, and the United States, are the principal powers with which Mexico maintains relations of foreign commerce; while the city of Mexico is the chief focus of internal trade, and Vera Cruz the principal port for maritime commerce. The total value of the foreign trade of Mexico in 1876 was—for imports, £5,600,000; for exports, £5,100,000. For the number of ships entering and clearing the ports of Mexico, see VERA CRUZ and TAMPICO. Mexico possesses about 400 m. of railway, the line from Vera Cruz to Mexico being one of the most wonderful pieces of engineering enterprise in the world. The annual traffic amounts to about 250,000 passengers, and 190,000 tons of freight. The financial condition of Mexico has been allowed to fall into such disorder since the establishment of independence that the expenditure has been continually increasing beyond the receipts. According to the printed estimates, the estimated amount of the budget for 1875–76 was £4,760,000. The total expenditure for the same year was estimated at £4,980,000. The revenue is derived mainly from the customs. The total amount of the national debt cannot be stated. The loans contracted by the imperial government are entirely repudiated by the present government.

Army, Navy, etc.—In accordance with the old constitution of Mexico, the standing army was to consist of 26,000 men, with a reserve of 65,000 men; but this number, which had fallen to nearly half the required force in 1855, has been so extensively reduced since that period by continual civil wars, that, according to Spanish authorities, the government of the late president Juarez, on the breaking out of hostilities with the French in 1862, was unable to bring into the field more than 5,000 infantry, 800 cavalry, and 9,500 of the national guard. The total strength of the army is now estimated at about 20,000 men. The navy consisted of only some 300 men, while the fleet numbered only 9 small ships of war, carrying in all between 30 and 40 cannon. Education in Mexico, long in the lowest possible condition, even among the wealthier classes, is now steadily improving. Liberal allowances have been made by the central and state governments for establishment of new schools, etc. In 1873 there were in Mexico nearly 4,000 public schools, with about 190,000 scholars.

Religion, etc.—The Roman Catholic is the dominant church of Mexico, but all other sects are tolerated. Mexico has 3 archbishops and 10 bishops. The administration of justice is not what it should be, but is not so inefficient, nor the courts so corrupt, as formerly. Brigandage and smuggling endanger personal security, and seriously damage the resources of the nation, but are gradually disappearing.

The supreme power of the state was, in 1858, vested in the hands of Benito Juarez, who was to bear the title of constitutional president, and administer public affairs in conjunction with a legislative congress, composed of a chamber of senators and lower house of representatives. Each province was to elect two senators and one deputy to every 40,000 inhabitants, and was, moreover, to have a separate provincial legislative chamber, presided over by its governor. President Juarez is undoubtedly, along with gen. Iturbide, to be regarded as the most distinguished character in modern Mexico. The unfortunate Maximilian was a mere episode in the career of the country. A provisional regency of the Mexican empire was appointed by the *Junta Superior del Gobierno;* which was itself constituted (June 16, 1863) by a decree of marshal Forey, leader of the French army of invasion. It was composed of 35 members. This junta at the same time established, under French influence, an *assembly of notables,* whom it charged with deciding in the name of the people what form of government Mexico should adopt.

On July 10, 1863, this body, by an overwhelming majority, decided in favor of a constitutional hereditary monarchy, and that the new ruler should bear the title of emperor of Mexico. See succeeding article. The present constitution dates from 1857. The executive power is vested in a president, elected by universal suffrage, for a period of 6 years. The legislative power is confided to a congress consisting of a house of representatives (one for each 80,000 inhabitants), and a senate (with two members for each state).

History of Mexico.—The history of ancient Mexico exhibits two distinct and widely differing periods, the former of which, that of the Toltecs, appears to have begun in the 7th and ended with the 12th c.; while the second, that of the Aztecs, began in the year 1200, and may be said to have been closed by the conquest of Cortes in 1519; for although the race has maintained occupation of the Mexican territory, its existence as a nation ceased with the Spanish domination. The origin and primitive seats of the Toltecs are shrouded in mystery; and all that we learn of this people is, that they came from the north, from some undefined locality, which they designated Tullan, and from whence they brought to the valley of Mexico the first elements of civilization. Their laws and usages stamp them as a people of mild and peaceful instincts, industrious, active, and enterprising. They cultivated the land, introduced maize and cotton, made roads, erected monuments of colossal dimensions, and built temples and cities, whose ruins in various parts of New Spain still attest their skill in architecture, and sufficiently explain why the name Toltec should have passed into a synonym for architect. They knew how to fuse metals, cut and polish the hardest stones, fabricate earthenware, and weave various fabrics: they employed hieroglyphics for the record of events, were acquainted with the causes of eclipses, constructed sun-dials, devised a simple system of notation, and measured time by a solar year, composed of 18 months of 20 days each, adding 5 complementary days to make up the 365, and intercalating 12¼ days at the expiration of every 52 years, which brought them within an almost inappreciable fraction to the length of the tropical year, as established by the most accurate observations. These and other arts, with a mild form of religion, and a simple but just mode of administering the laws, the Toltecs bequeathed to the Aztecs, who engrafted upon the civilization of their predecessors many fierce and sanguinary practices in their religious, and many puerile usages in their social life. Nothing is known of the exact time, and still less of the manner and causes of the departure of the Toltecs from Mexico; but it has been conjectured that they went towards the south, and that the colossal architectural remains of the cities of Palenque, Uxmal, and Mitla, in Central America, are the work of their hands. The Aztecs, as we have said, imparted to the institutions of the Toltecs a tinge of their own somber cruelty, and produced an anomalous form of civilization, which astonished the Spaniards by its mingled character of mildness and ferocity. Like the Toltecs and the Chichmecs, a rude tribe who had succeeded them, the Aztecs came from the north, and after wandering from place to place, founded in 1325 the city of Tenochtitlan, or Mexico. On the arrival of the Spaniards, their empire was found to extend from ocean to ocean, stretching on the Atlantic from 18° to 21° n. lat., and on the Pacific from 14° to 19° n. lat. Their government was an elective empire, the sovereign being selected from the brothers of the deceased prince, or, in default of them, from his nephews. Their laws were severe, but justice was administered in open courts, the proceedings of which were perpetuated by means of picture-written records.

The Aztecs believed in one supreme invisible creator of all things, the ruler of the universe, named Taotl—a belief, it is conjectured, not native to them, but derived from their predecessors, the Toltecs. Under this supreme being stood 13 chief and 200 inferior divinities, each of whom had his sacred day and festival. At their head was the patron god of the Aztecs, the frightful Huitziiopochtli, the Mexican *Mars*. His temples were the most splendid and imposing; in every city of the empire his altars were drenched with the blood of human sacrifice. Cortes and his companions (see DIAZ) were permitted by Montezuma to enter that in the city of Mexico, and to behold the god himself. "He had a broad face, wide mouth, and terrible eyes. He was covered with gold, pearls, and precious stones; and was girt about with golden serpents. . . . . On his neck, a fitting ornament were the faces of men wrought in silver, and their hearts in gold. Close by were braziers with incense, and on the braziers 3 real hearts of men who had that day been sacrificed" (Helps's *Spanish Conquest in America*, vol. ii., book x., chap. 4). The smell of the place, we are told, was like that of a slaughter-house. To supply victims for these sacrifices, the emperors made war on all the neighboring and subsidiary states, or in case of revolt in any city of their dominions, and levied a certain number of men, women, and children by way of indemnity. The victims were borne in triumphal processions and to the sound of music, to the summit of the great temples, where the priests, in sight of assembled crowds, bound them to the sacrificial stone, and opening the breast, tore from it the bleeding heart, which was either laid before the image of their gods, or eaten by the worshipers, after having been carefully cut up and mixed with maize. In the years immediately preceding the Spanish conquest not less than 20,000 victims were annually immolated. These atrocities were incongruously blended with milder forms of worship, in which fruits, flowers, and perfumes were offered up amid joyous outbursts of song and dance. According to their mythology, Taotl, who delighted in these purer sacrifices, had once reigned in Anahuac (a name which at first probably applied only to the country in the immediate vicinity of

the capital, though afterwards it was applied to the whole Aztec empire) in the golden age of the world, but being obliged, from some unexplained cause, to retire from earth, he departed by way of the Mexican gulf, promising to return. This tradition accelerated the success of the Spaniards, whose light skins and long dark hair and beards were regarded as evidences of their affinity with the long-looked-for divinity. The Mexican priesthood formed a rich and powerful order of the state, and were so numerous that Cortes found as many as 5,000 attached to the great temple of Mexico. The education of the young of both sexes remained till the age of puberty in the hands of the priests and priestesses; and the sacerdotal class were thus able to exercise a widely-diffused influence, which, under the later rulers, was almost equal to that of the emperor himself. The women shared in all the occupations of the men, and were taught, like them, the arts of reading, writing, ciphering, singing in chorus, dancing, etc., and even initiated in the secrets of astronomy and astrology.

On the arrival of Cortes in 1519, the Aztec throne was occupied by Montezuma, an energetic prince, who, after his election to the throne, which for several generations had been occupied by his ancestors, made successful war on the powerful and highly-civilized neighboring state of Tlascala, and on Nicaragua and Honduras; after a time, however, he grew indolent, and alienated the affections of his subjects by his arrogance and exactions, and by his unremitting devotion to the services of the temples. According to the oracles which he frequently consulted, great changes were impending over the empire, the return of Quetzalcoatl was near at hand, and the fall of his race was impending. The tidings of the arrival on the coast of the expedition of Grigalva in 1518 terrified Montezuma and his priestly councilors; and when the hieroglyphic reports of his provincial officers announced the landing in the following year of Cortes and his companions, he endeavored to propitiate the dreaded strangers by sending an embassy charged with valuable gifts to meet them. The road to success was thus open to the Spanish captain, who, with a handful of men, advanced from St. Juan de Ulloa to Mexico, and gradually subdued the entire empire of the Aztecs, whose power crumbled to dust before the greater energy and superior civilization of their Christian invaders. In 1540 Mexico was united with other American territories under the name of New Spain, and governed by viceroys appointed by the mother-country. The intolerant spirit of the Catholic clergy led to the suppression of almost every trace of the ancient Aztec nationality and civilization, while the strict system of sequestration enforced in Mexico crippled the resources of the colony; yet notwithstanding these drawbacks, Mexico ranked first among all the Spanish colonies in regard to population, material riches, and natural products. It may be said to have vegetated for nearly three centuries in a state of semi-quiescent prosperity, interrupted by few disturbances of any kind until the year 1810, when the discontent, which had been gaining ground against the vice-regal power during the war of the mother-country with Napoleon, broke into open rebellion under the leadership of a country priest named Hidalgo. The defeat and subsequent execution of the latter in 1811 put a partial stop to the insurrection; but the atrocities committed under the sanction of the new viceroy, Calleja, exasperated the people, and gave an irresistible impulse to the revolutionary cause. Guerrero and Iturbide in turn gained signal advantages over the Spaniards. For a time Iturbide maintained a self-established imperial rule over the colony; but on the downfall consequent on his tyrannical abuse of power, a constitutional mode of government was inaugurated, and in 1824 the independence of Mexico, which had chosen a federal republican form of government, was finally established, and in the following year definitely recognized by every foreign power except Spain. The Mexican war was stained with excesses and atrocities on both sides; but it must be confessed that the Spaniards gained an unenviable pre-eminence in regard to the wanton cruelty which characterized their method of conducting hostilities. With them the war was one of extermination, every commander being allowed, at his own discretion, to hunt down and slaughter the insurgents like brutes.

The welfare of the new republic was unhappily disturbed by constant outbreaks of civil war under the leadership of the escosses, or aristocratic faction, and the yorkinos, or democrats; and the history of the quarter of a century during which Mexico has exercised independent power, leaves little to recount beyond ever-recurring acts of violence, and the rapid and summary deposition of one president after another. In 1836 Texas secured its independence of the Mexican republic, for which it had struggled for several years, and at the same period differences arose with France, which were, however, brought to a peaceful conclusion after the taking of Vera Cruz in 1838 by the French troops. In 1841 gen. Santa Anna, on the retirement of Bustamente, succeeded in regaining the direction of affairs, from which he had been more than once deposed, and, under the title of dictator, exercised the power of an autocratic ruler. In 1845 Mexico was compelled to recognize the independence of Texas, which was incorporated with the United States, whose troops having entered the Mexican territory, provoked a declaration of war on the part of the Mexican government. Hostilities were carried on with great energy by both parties until 1848, when peace was finally concluded, after several bloody engagements had been fought without any definite result on either side; and the city of Mexico had been stormed and taken by the Americans under gen. Scott. In 1852, after Santa Anna and Herrera had been in turn deposed and recalled to power,

a revolutionary movement of more than ordinary importance brought gen. Cevallos for a time to the head of affairs; but, when the insubordination and arrogance of the soldiery threatened universal anarchy, Santa Anna was again recalled, Mar. 17, 1853. Having reorganized the army, and suppressed by the most cruel severity the insurrection of the federals, he declared himself president for life, and thus again rekindled civil war. In 1855 he had to flee from the country. Since then, utter confusion has prevailed. Santa Anna was succeeded by gen. Alvarez, who held office for about two months, after whom came gen. Comonfort, who was forced to resign in 1858; when a gen. Zulvago assumed supreme power, but was almost immediately deposed by a gen. Robles. This person also proving a futility, Benito Juarez was elected; but his claims were contested by gen. Miramon—the head of the priestly and conservative party—and the country was plunged in civil war. The acts of wanton aggression and flagrant injustice perpetrated on foreigners in Mexico during this period of internal disorder, during which the cortes passed an act suspending all payments to foreigners for two years, could not fail to draw upon the Mexican government the serious remonstrance of those European powers whose subjects had just cause of complaint; and the result was to bring a fleet of English, French, and Spanish ships into the Mexican gulf for the purpose of enforcing satisfaction. In Dec., 1861, the British minister left Mexico, and the Spaniards disembarked a force at Vera Cruz, and took possession of the fort of St. Juan d'Ulloa, a step which was soon followed by the arrival before the former city of the allied fleet. A proclamation, signed by the commanders-in-chief of the three naval divisions, and addressed by them to the Mexican people, elicited no satisfactory reply; and steps were accordingly taken to advance at once upon the capital. This measure alarmed the provisional government of Mexico, and brought about an armistice, with a view of negotiating a treaty for the future regulation of commercial intercourse between Mexico and the great European powers. This treaty was drawn up and provisionally ratified by the different commanders, but not confirmed on the part of France, and consequently the French troops retained occupation of the Mexican territory after the English and Spaniards had declined to join in further hostile demonstrations. In April, 1862, the French emperor formally declared war against the government of Juarez, who had assumed arbitrary rule as president of the republic. The French, who spent £8,000,000 on the Mexican expedition, did not meet with the sympathy and welcome from the people at large which the assumed unpopularity of Juarez had led them to anticipate; and, although the taking of Puebla and other decided successes gave them a firmer footing in the country, it was evident that whatever grievances the Mexican nation had against their government, they entertained a deeply rooted hatred against foreigners, and were certainly not prepared to welcome with cordial unanimity the thorough reorganization of their political system which the European powers, with France at their head, were initiating for the country.—Comp. *Le Mexique, Ancien et Moderne*, par Michel Chevalier (Hachette, 1863).

MEXICO. [*From Supplement.*] After the declaration of war against Juarez by the French, they issued a proclamation to the Mexican people, April 16, 1862, setting forth that one of the objects of the contest was to rescue them from the tyranny of the president, and put the government of the country on a stable footing. Little faith, however, seems to have been put in these professions; and the invaders, though joined by Marquez, the military leader of the clerical party, met with little success till the arrival of gen. Forey with a reinforcement from France in September. Forey then took the command in chief, addressed a proclamation to the Mexicans, promising them perfect liberty in the choice of a new government in room of that of Juarez; and in the spring of 1863 concentrated the French troops, and marched on Mexico. On his way he took the strongly fortified city of Puebla after a two months' siege, capturing its defender, Ortega, and his whole force (May 18); and, Juarez having fled from the capital, and transferred the seat of his government to San Luis Potosi at their approach, the French entered Mexico on June 10. A fortnight afterwards, a provisional government, headed by gen. Almonte, was established, and an "assembly of notables," which was called (June 24) to deliberate upon the best form of government, decided in July, by a vote of 231 to 19, in favor of a "limited hereditary monarchy," with a Catholic prince for sovereign, under the title of "emperor of Mexico," and resolved in the first place to offer the crown to the archduke Ferdinand *Maximilian* (q.v.) of Austria, failing whom, to request the good offices of the emperor Napoleon in obtaining another monarch. That this resolution was the fruit of a general earnest wish on the part of the Mexican notables, the feeble and almost unwilling support most of them accorded to their chosen emperor after his desertion by the French, will not allow us to suppose; but, on the other hand, we have not the slightest reason for believing that anything approaching intimidation or undue influence was exercised by the French. Most of them doubtless argued that a government supported by France would be sufficiently powerful to maintain the country in a state of tranquillity, and in the hope of this long wished-for result, cast in their lot for empire. These changes were, of course, vigorously protested against by the republican assembly at San Luis, and the two parties prepared with eagerness to try the fortune of war. On Oct. 1 Forey departed from Mexico, and gen. Bazaine took the command of the French forces, and commenced the campaign with vigor. The result of the winter's struggle

was that in spring the imperialists were in possession of the whole country, with the exception of the four northern provinces. On Oct. 3, 1863, the archduke Maximilian had given audience at his château of Miramar, near Trieste, to a deputation which was sent to offer him the crown, and had accepted it. On May 29 the emperor and empress landed at Vera Cruz, and on June 12 made their public entry into the capital; and soon after the middle of the year the imperialists had gained possession of every state in the kingdom, Juarez fleeing in August to the United States. As small parties of the republicans still maintained a species of guerrilla warfare in various districts, Maximilian, on Oct. 2, 1865, published a proclamation, menacing with death, according to the laws of war, all who were found in armed opposition to his government; the republic having ceased, not only by the express wish of the nation, but also by the expiry (Nov. 22, 1864) of Juarez's term of office, and his flight beyond the frontiers; an amnesty, however, being accorded to such as submitted before Nov. 15. In accordance with this edict, gens. Arteaga and Salazar, who were defeated and captured Oct. 13, were shot on the 21st; and many hundreds of captured republicans were dealt with under the terms of the same order.

This contest in Mexico had from the commencement excited the liveliest interest in the United States, though the civil war, raging there also, prevented any active interference in the affairs of its neighbor. A general impression existed that France had taken advantage of the troubles of the United States to establish its authority firmly on the American continent; and this belief, along with the violation of the "Monroe doctrine" by the establishment of imperialism in Mexico, induced the United States to give all their sympathy and diplomatic aid to Juarez and his supporters. In Nov. 6, 1865, secretary Seward forwarded a dispatch to Paris, in which it was stated that the presence of the French army in Mexico was a source of "grave reflection" to the government of the United States, and that the latter could on no account allow the establishment of an imperial government, based on foreign aid, in Mexico, or recognize in that country other than republican institutions. This dispatch led to an interchange of diplomatic notes during the following six months; the Americans holding firmly to their first statements, and even insinuating the probability of an armed interference on behalf of Juarez; till the French emperor, who was wearied with a contest so expensive and, though successful, so barren of lasting fruits, ultimately agreed, in the summer of 1866, to withdraw his troops from Mexico. The Belgian legion and some Austrian levies, however, were not included in this arrangement. Accordingly, from the autumn of 1866 till Feb., 1867, the French troops by degrees evacuated Mexico, and their departure was the signal for a fresh rising on the part of the Juarists. See MAXIMILIAN and JUAREZ. Since 1871 Mexico has remained a republic; but it has repeatedly been disturbed by rebellion and civil war.

MEXICO (*ante*). Juarez, president of Mexico until 1872, was succeeded by Lerdo de Tejada (q.v.), under whose administration the country remained in a satisfactory condition. This statesman was minister of foreign affairs under Juarez, and his ability as a diplomatist was well recognized. The perpetual tendency to revolt which characterizes the Mexican people, though smothered during the presidency of Lerdo, became active toward the end of 1876; and his re-election for four years precipitated a revolution, headed by Porfirio Diaz, by which the latter gained control of the government, while Lerdo and his cabinet fled. President Diaz remained in possession of the government until 1880, when the regular quadrennial election resulted in the success of the government candidate, gen. M. Gonzalez, who was declared president; he had been secretary of war in 1878. A few revolutionary outbreaks which occurred during president Diaz's administration were promptly suppressed, through the employment of vigorous measures by the government.—A table published in Mexico in 1876 (not entirely trustworthy) gives the pop. of the republic as 8,743,000, and that of the city of Mexico as 250,000. The republic is divided politically into 27 states, one federal district, and one territory. The names of the states are as follows: Aguas Calientes, Campeachy, Chiapas, Chihuahua, Coahuila, Colima, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Mexico, Michoacan, Morelos, Nuevo Leon, Oajaca, Puebla, Querétaro, San Luis Potosi, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxclala, Vera Cruz, Yucatan, and Zacatecas. Each of these states is administrated over by a governor, and an assembly called the state congress. The army of the republic comprised, in 1879, 20 battalions of foot, 14,640 men and 765 officers; 10 corps of horse, 4,840 men and 290 officers; 4 brigades, of 4 batteries each, of artillery, 1315 men and 148 officers; coast-guards, 71 men and 22 officers; and invalids, 265 men and 19 officers; total, 22,375. The annual expenses of the Mexican army and navy (the latter comprising only 4 gun-boats) average over $8,000,000.—The national debt of Mexico was set down in 1878 at $131,914,665; of which, to Great Britain, $69,311,657; to Spain, $9,460,986; to France, $2,859,917: interest, $57,392,145; miscellaneous (including American claims awards $3,375,123), $6,121,753. The annual revenue is about $17,000,000; the annual expenditure about $19,000,000. The total amount of the exports varies between $25,000,000 and $35,000,000 annually, that of the imports being about the same, though the prevalence of smuggling renders it impossible to more than approximate to the correct figures. The amount of the trade of Mexico

with the United States is only attainable in part from the published reports, as given in the following table.

TRADE BETWEEN MEXICO AND THE UNITED STATES (IN PART) FOR 1878.

	Imports.	Exports.
Vera Cruz		$1,587,916 29
Mazatlan	$1,182,987 00	2,398,493 00
Matamoras	865,011 00	476,831 00

At the close of the year 1879 there were 372 m. of railroad in operation in Mexico, the principal line being that between Vera Cruz and the capital. Education was conducted, in 1876, in the republic by 8,103 primary schools; 54 professional and secondary schools; a national preparatory school in the city of Mexico; and other institutions of learning. There were also 40 public libraries; 3 of which, containing an aggregate of 236,000 volumes, were in the capital. The important staple articles of export are mahogany and dye-woods, cochineal, tobacco, coffee, sugar, and the hennequen plant (*agave Americana*), from which is prepared Sisal hemp. During the year 1875–76 Yucatan produced 22,000,000 lbs. of this fiber, representing the product of more than 18,000,000 plants under cultivation. The capital invested in this industry was $5,147,000. Maize is largely cultivated, and yields three and sometimes four crops annually; but, with wheat and rice, is only grown for home consumption. The value of the exportation of tobacco in 1873 amounted to $132,984.75.

MEXICO, or MEJICO, the capital city of the republic, is situated in 19° 20′ n. lat., and 99° 5′ w. long., at an elevation of nearly 7,500 ft. above the level of the sea, in the valley of Tenochtitlan, 2½ m. w. of lake Tezcuco. The pop. was, in 1878, 230,000. This beautiful city, which is built on the site of the ancient Tenochtitlan of the Aztec empire, is situated on an extensive plateau, having an area of more than 1700 sq.m., surrounded by lofty mountains, and including 5 lakes within its area. The principal streets, which all converge towards the great square of Mexico, are regularly and well laid-out, broad, clean, and well-paved and lighted; but the buildings, both private and public, are low, and of a light style of architecture, in consequence of water being found in many parts of the city at only a few feet below the surface, and partly from apprehension of earthquakes. The plaza mayor, one of the finest squares of the western world, contains the cathedral, a spacious and imposing building, erected on the ruins of the great *teocalli*, or temple of the Aztec god Mixitli, and adorned with the *kellenda*, a circular stone, covered with hieroglyphics, by which the Aztecs used to represent the months of the year. The palace of the cortes, in the same square, consists of various buildings appropriated to offices of state, government schools, and public institutions of various kinds, but like everything else in Mexico, has been suffered gradually to fall to decay since the evacuation of the Spaniards. Mexico contains 14 churches, some monasteries and convents, and numerous charitable institutions; the fine hospital has been converted into a barrack. There are schools of jurisprudence, medicine, agriculture, engineering, and an academy of the fine arts, containing valuable Aztec antiquities; also several theaters and a circus: the bull-ring was demolished in 1874. In addition to the ordinary *alameda* or public walk of a Spanish city, Mexico is remarkable for the extent and beauty of its *paseos*, or raised paved roads, planted with double rows of trees, which diverge far into the country from every quarter of the city. Mexico still boasts a few of the water-gardens for which the ancient city was so celebrated, and, although no longer floating, as in the days of the Aztecs, they form attractive objects in the midst of the surrounding swamps, which, by the negligence of the Mexicans, have been suffered to increase in the vicinity of the lakes. The trade of Mexico is chiefly a transit-trade, although it has a few manufactures, as cigars of superior quality, gold-lace, hats, carriages, saddlery, etc.; and these articles, together with gold and silver, and some of the numerous valuable natural products of the Mexican plain, it transports, chiefly by means of mules, to Vera Cruz and other ports, importing in return the manufactured goods of Europe and various colonial products.

MEXICO, a village in n.e. Missouri, a junction of the St. Louis, Kansas City and Northern railroad, with the Louisiana and Missouri river railroad, and the South Branch; pop. '80, 3,841. It is the county seat of Audrain co., and is pleasantly located on an affluent of the Salt river. It is 50 m. n. of Jefferson City, and 108 m. w. of St. Louis. It is the seat of Hardin (female) college, has good public schools, an elegant court-house, a variety of stores, 3 newspapers, and 3 banks. Its industries are the manufacture of woolen goods and plows.

MEXICO, GULF OF, a basin of the Atlantic ocean, the estimated extent of which is 800,000 English sq.m., is closed in by the United States on the n., by Mexico on the w. and s., and its outlet on the e. is narrowed by the jutting peninsulas of Yucatan and Florida, which approach within 500 m. of each other. Right in the middle of this entrance is planted the island of Cuba, dividing the strait into two—the strait of Florida, 120 m. wide, between Cuba and Florida, and the strait of Yucatan, 105 m. wide, between Cuba and Yucatan. The former, or northern, entrance connects the gulf with the Atlantic ocean; the latter, or southern, with the Caribbean sea. The depth of water

is supposed nowhere to exceed three-fourths of a mile, yet the gulf contains few islands—the Florida Keys, the deltas of the Mississippi, and a few on the coast of Yucatan, being the most important of them. The shores, which are very sinuous, form numerous bays, the largest of which is the bay of Campeachy (q.v.). The coasts are mostly low and sandy or marshy, and are lined with numerous lagoons; good harbors are consequently not numerous, the best being those of Vera Cruz, New Orleans, Pensacola, and Havana. The gulf is visited by violent northern gales called *nortes*, which prevail from September to March, when they attain their maximum force and then immediately terminate. The most remarkable feature in connection with the gulf of Mexico is the *gulf stream* (q.v.), which enters it by the southern channel, passes round it and emerges through the strait of Florida. Owing partly to the presence of this heated current, the temperature of the gulf is 8° or 9° higher than that of the Atlantic in the same latitude

MEXICO, ANCIENT ARCHITECTURE OF, structural remains of the Aztec, Toltec, and other races who peopled Mexico prior to and at the time of the Spanish invasion under Cortez. Although these remains have been from time to time explored and investigated, it has been chiefly with the desire to sustain some comprehensive theory of comparative architecture, and from a stand-point of supposed similarity in their case to the remains of ancient Egypt, India, Greece, and, as lord Kingsborough conceived, of Jerusalem. Humboldt's work on New Spain first excited the curiosity of the Europeans, and rescued the antiquities of Mexico from the oblivion to which they had so long been consigned; but it was not until a comparatively recent period that their value as works of art, and as indications of a considerable advance in civilization, was fully appreciated. Pyramids having even a larger base, and being otherwise scarcely inferior in magnitude to those of Egypt, are found in many parts of Mexico; while the general condition of architecture at the period when these were erected has been found to be of a character to surprise and charm even those familiar with the monuments of the east. Mexican architecture is that of two distinct peoples: the Toltecs, who occupied Mexico prior to the 7th c. of our era, and the Aztecs, with whom may be associated the Chichemacas, who inhabited the country at the Spanish conquest early in the 16th century. That which is believed to belong to the earlier race is also the most remarkable; the later would seem to have been derived from it. Architecture in its essential features similar to that of the Toltecs exists in various parts of Central America, and may be associated with it. As far as our present knowledge extends, the architecture of Mexico is to be regarded as, in the main, self-developed, rather than borrowed from that of any other country. The buildings display vast labor, and often great skill, and are works of singular interest, promising to repay a far more thorough investigation than they have ever yet received. As in almost every other national architecture, the most important edifices are those devoted to the purposes of religion. These are known as teocallis, and appear, like the Egyptian temples, to have contained apartments for the priests; they also contained sepulchral chambers, and had descending galleries leading down into cavernous recesses or halls, which are variously conjectured to have been used for religious mysteries, or as places for the concealment of treasures, and may probably have been used for both purposes. In plan these buildings are square; in form pyramidal, generally rising in successive stories or stages, like a series of truncated pyramids placed one above another, each successive one being smaller than the one on which it immediately rests, so that it stands upon a platform or terrace; the holy place, or temple proper, being built on the summit, and subordinate in effect to the pyramid. The sides of the pyramids face the cardinal points; their angle of inclination is seldom less than 70°, which differs little from that of the pyramids of Egypt. The largest, most sacred, and best-known of these teocallis is that of Cholula, for which a fancied prototype has been found in the temple of Belus, as described by Herodotus. This pyramid-temple of Cholula is now in appearance little more than a vast mound of earth covered with vegetation, and crowned with a small church. But on near inspection its architectural features are sufficiently distinguishable. The base of this huge structure measures 1440 ft. each way (some authorities say 1488 ft.); its height is 177 ft; the sides of the base of the great pyramid of Gizeh are only 763 ft., so that the area of the Mexican pyramid is nearly four times that of the greatest of those of Egypt, but it is not a third of their height. The body of the pyramid of Cholula is formed of clay and sun-dried bricks. It consists of four terraces; and on the summit is a small church dedicated to the Virgin, which occupies a temple of the Toltec god of the air. From the perishable material of which it was constructed, the decorative features have almost entirely disappeared, though there are evidences remaining of what were once elaborate and interesting sculptures. In its present condition but a very imperfect notion can be formed of its original appearance. It contains spacious sepulchral cavities; and a square chamber formed of stone and supported by beams of cypress wood was some years ago discovered in it, within which were two skeletons and several painted vases. The buildings outside the limits of the valley of Mexico, and especially those in Central America, are in far better preservation. One of the most stupendous monuments of this style of architecture occurs at Palenque, in the state of Chiapas, Mexico. The great teocalli at Palenque (built, according to the startling assumption of lord Kingsborough, after the model of

the temple of Solomon) comprised within its extensive precincts various sanctuaries and sepulchers, courts and cloisters, subterraneous galleries, and cells for the habitation of the priests. The whole rests on a platform composed of three graduated terraces, and forms a spacious quadrangle inclosed by porticoes. On each side of the exterior is an ascent or flight of stairs, and on the east a second flight leading down, after the first is ascended, into the cloistered court. Beneath the cloisters are what are conjectured to have been initiatory galleries; and in the center of the quadrangle is what appears to be the ruins of an altar or "high place." The temple itself is oblong in plan, 76 ft. wide by 26 ft. deep, and is decorated with sculpture and hieroglyphics executed in stucco. The roof is formed by graduated courses of stone, which meet at the summit, and has six ornamental projections, placed above the openings formed by the supporting piers, which were probably intended to support small idols or ornamental figures. The city of Palenque itself exhibits a variety of buildings, temples, palaces, baths, and private houses, all manifesting excellence of workmanship combined with considerable skill in design. The palaces, or houses of the kings, appear to have resembled the temples in being based on pyramidal substructures; but these are generally oblong instead of square in plan, and much lower than the temple pyramids. Their substructure is usually of stone, and very massive, elaborately sculptured with figures of idols and masks of monstrous proportions, scrolls, mat-work, etc., often executed with great skill. The upper part appears to have been of wood, but has mostly perished. The ruins of Palenque extend for more than 20 m. along the summit of the ridge which separates the country of the wild Maya Indians from the state of Chiapas, and must anciently have embraced a city and its suburbs. The principal buildings are erected on the most prominent heights, and several of them, if not all, have been provided with stone stairs. The principal edifice, which has been sometimes styled a palace, is built in several squares; but the main halls or galleries run in a direction from the n.n.e. to the s.s.w.; and this position has been observed in all the edifices examined, be their situation what it may. The houses have all been substantially built of stone cemented with mortar; but symmetry has been but little studied in their construction, it is supposed less from ignorance than design. Other ruins of considerable magnitude, and distinguished by numerous sculptures, are found upon the neighboring hills. In the vicinity there is one building in particular, apparently a religious edifice, which deserves notice. Two galleries constitute its foundation; the front one occupying its whole length, while the back one is divided into three compartments. Of these the eastern has the appearance of a dungeon; the western is a small room with a chapel ornamented with elegant relievos. These consist of representations of the human figure, in various attitudes, and adorned generally with boughs and feathers. There are other very interesting ruins in this part of Mexico, but they have not as yet been sufficiently examined for description. One of the most characteristic of the palaces is that of Mitla, the remains of which show that it must have been an edifice of great extent and grandeur. It appears to have originally comprised five distinct portions, which have been regarded as places of retirement for the kings, or as tombs. Three of these still remain. The principal one is nearly 130 ft. long. A staircase leads to a subterranean apartment 88 ft. by 26, the walls of which, like the exterior, appear to have been sculptured or tooled in imitation of mat or basket-work—a species of decoration characteristic of Toltecan taste, and often found in sepulchral chambers. This same building has also a spacious hall supported by six plain cylindrical columns of porphyry, without base or capital, and in some respects differing from any found elsewhere. The ceiling which they support is formed of beams and slabs of cypress or savin wood of large size. Over the principal entrance is a stone lintel 12 ft. long and 3 ft. deep. There is no appearance of windows. The interiors of the chambers have been elaborately painted with representations of sacrifices, trophies, weapons, etc.; and with ornaments resembling those found in Etruscan decorations. At Testihuacan, about 25 m. to the n.e. of the city of Mexico, are several hundred small pyramids ranged in files or lines, and two larger ones, which are believed to have been consecrated to the sun and moon. Each of the latter is divided into four platforms, the slopes between which consisted of steps, and on the summit was a colossal stone statue covered with plates of gold, which were stripped off by the soldiers of Cortes, while the statues were destroyed. Besides monuments which are chiefly works of magnificence, others exist which attest the high degree of civilization attained by the Toltecans, such as roads and bridges. The former of these were constructed of huge blocks of stone, and frequently carried on a continued level, so as to be viaducts across valleys. There are also rock-hewn halls and caverns which curiously resemble the Pelasgic remains. Doorways to subterraneous galleries and apartments are found similar to the gate of Mycenæ; and another similarity exists in the peculiar triangular arch formed by courses of stone projecting over each other, of which specimens are found in the cloisters of the building at Palenque. There are also extensive works for defensive purposes, earthen sepulchral mounds, etc. The mountain of Tezcoca is nearly covered with ruins of ancient buildings. There is also evident a remarkable skill and high degree of taste in sculpture. Many of the statues found at Otumba, Mitla, Jochichalo, and the magnificent flower-temple of Oajaca, are sculptured in a purely classical style; while vases rivaling those of Egypt and Etruria have been discovered in sepulchral excavations. The successors of the Toltecs, the Chichemacas, the Acolhuas, and other nations of Mexico, built houses and formed

cities, seeming to be well skilled in architecture. The Mexicans (Aztecs) constructed their houses and public edifices with roofs of cedar, fir, cypress, or of a native wood called ojametl: the columns, of common stone, except in the palaces, were either cylindrical or square, and without base or capital. In the palaces these columns were of marble, and even alabaster. The pavements were of a common red stone, sometimes tesselated with marble and other ornamental substances. Cortes, in a letter to Charles V., said of Montezuma: "He had, besides those in the city of Mexico, other such admirable houses for his habitation, that I do not believe I shall ever be able to express their excellence and grandeur; therefore I shall only say that there are no equals to them in Spain." The Mexicans also constructed, for the convenience of their inhabited places, several excellent aqueducts. Those of the capital, for conducting the water from Chapultepec, 2 m. distant, "were two in number, made of stone and cement 5 ft. high, and 2 paces broad, upon a road raised for that purpose upon the lake, by which the water was brought to the entrance of the city, and from thence it branched out through smaller channels to supply several fountains, and particularly those of the royal palaces." The great temple in the city of Mexico, the sanctuary of *Mexitli*, whence "Mexico," was built by the emperor Ahuitzotl. It occupied the center of the city, and Cortes stated that on the space which it occupied a town of 500 houses could have been erected. It was inclosed by a square wall, 8 ft. high and very thick, crowned with battlements; built of stone and lime, and ornamented with many stone figures in the form of serpents. It had four gates to the four cardinal points, and over each gate was an arsenal filled with offensive and defensive weapons, from which the soldiers were supplied when it was necessary. In the center of the inclosure was an immense flat, solid building, built in five gradually narrowing platforms or terraces, with stairs to each terrace at the s.w. corner, so arranged that each terrace had to be traversed around the entire building before the next staircase could be reached. At the top of the structure, at one end, were two tall towers, sanctuaries; here also was an altar for sacrifice, and two stoves of stone, in which a fire was kept burning night and day. In the space between the wall and the great temple were 40 lesser temples; a place for the native religious dances; colleges for the priests and seminaries for children; and many other buildings, including a great house of entertainment for strangers of distinction who visited the place from curiosity, or to join in the religious rites performed there. Out of the city of Mexico the most celebrated temples were those of Tezcuco, Cholula, and Teotihuacan. Cortes said that from the top of one temple in Cholula he had counted more than 400 towers of others. Torquemada estimates that there were upwards of 40,000 throughout the empire, and there were certainly hundreds in each principal city. The peculiar coincidences of form, position, and ornamentation to be found between these structures and those employed for similar uses among the ancient Egyptians, have given rise to a belief in some relation between them, which is not unfounded; but no certain theory as to this relation has ever yet been formulated. For many years the ruins and monuments of ancient Mexico had been suffered to lie uninvestigated, and their secrets remain unrevealed—further than had occurred in the works to which reference has been already made, and others like them, of a comparatively remote date. In the spring of 1880 an expedition under the direction of M. Désiré Charnay undertook a careful exploration of the territory in question, and the result of this examination was communicated to the world by M. Charnay through the pages of the *North American Review*, from which we gather the following information. The first visit of the exploring party was made to the ruins of Teotihuacan, a city which is said by M. Charnay to have been about 23 m. in circumference. "At first view," he writes, "one can form no just idea of the grandeur of these ruins. As with ruins in general, especially when they are overturned and wrecked like those before us, one experiences a grievous disillusion when he looks at them for the first time. It is only after you have made a thorough study of them in mass and in detail that they impress you with their amazing vastness. Nowhere else in America can you, in my opinion, find a more imposing mass of ancient ruins, nor do I know of anything that can compare with this city of the gods." Here is the pyramid of the sun, whose base is 761 ft. square, and its height 216 ft.; its four sides facing the four cardinal points. It is constructed of volcanic *débris* laid in vegetable mold. There is no sign of mortar, but the structure was coated with cement, of which large slabs remain in perfect condition. Torquemada said of this city: "All these temples and palaces, and all these houses round about, were wholly built of white polished lime, so that on beholding them from afar one experienced no end of pleasure at the sight. The alleys, the streets, and the plazas were of colored and polished cement, and so fair were they, so cleanly and so shining, that it seemed impossible that human hands should have been able to construct them, or that human feet durst tread them. And so true is this that, all exaggeration aside, my report can be believed, for in addition to what others have certified to me I have myself seen certain ruins that gave proof of all I have said; and amid these temples were trees and flowers, magnificent gardens, and parterres breathing fragrance, all for the service and the ornamentation of the temples." It is stated that there were 27,000 buildings in Teotihuacan, not counting the temples. Charnay says that the term *Toltec* meant "builder," or "architect," and that it was applied to those who reared cities and built edifices, and not to any particular race or nation. In upper Mexico the material used in building was adobe; in some provinces a mixture of stones

and mud: at Hochicalco and at Teotihuacan a mixture of volcanic stones and mud, covered with a layer of cement; at Mexico it was adobe covered with cement or lime, and polished; at Oaxaca it was stones and mortar overlaid with cement, and this cement modeled into bas-reliefs; at Palenque, too, there are sculptured stones bearing inscriptions; in Yucatan there are pyramids and monuments of stone and mortar; the builders used the material nearest to them, but the general style of the architecture and the methods of building are in all instances nearly identical. Tula, which was another site visited by Charnay, the ancient metropolis of the Toltecs, 65 m. n. of the city of Mexico, was founded in 667. Here he excavated Toltec dwellings, found specimens of their sun-burned bricks, and numerous vases and other articles of pottery. He also claimed to have discovered fragments, or a fragment of a glass vessel, now iridescent from long burial under ground. A palace was also unearthed having 43 apartments. Under the reign of Mitl, in 927, the race and empire of the Toltecs reached the climax of their fortunes. The population had increased to such an extent that the nation occupied a territory more than 3,000 m. in circumference. The population of Teotihuacan is believed to have been half a million. M. Charnay's exploration is conducted with all the zeal and enthusiasm which characterized that of Dr. Schliemann in ancient Ilium, and promises to reveal much that has been unsuspected with regard to the ancient civilization of Mexico, as this was displayed in the condition of the arts, and particularly of architecture, among its people. In the mean time it has not advanced sufficiently far at the present writing to have demonstrated either the justness or the inaccuracy of past theorists on the probable origin to which these may be attributed. See CHOLULA and PALENQUE, *ante*.

MEXICO, PICTURE WRITING OF. See HIEROGLYPHICS, *ante*.

MEYENDORFF, the name of a Russian family which originally lived in Saxony. PETER, 1796–1863, was ambassador to Austria in 1850, and signed the convention of Olmütz. GEORG, d. 1863, wrote *Voyage d'Orembourg à Boukhara*. FELIX, d. 1871, was a son-in-law of prince Michael Gortchakoff, *chargé d'affaires* at Rome, and afterwards at Carlsruhe.

MEYER, FELIX, 1653–1713; b. Switzerland; studied art at Nuremberg, and afterwards under Ermels, a landscape painter. He then went to Italy to continue his studies, but the climate proving injurious to his health, he returned to Switzerland. He studied, and represented henceforth in his pictures, the scenery of his country. He was not successful as a figure painter; but as a landscape painter he united a quick imagination with great technical skill and swiftness of execution. In illustration of the latter quality, the story is told that he was one day asked by the abbot of St. Florian, in Upper Austria, the proper design for painting in fresco two great rooms in the abbey, which the artist engaged seemed unable to decorate in a suitable manner. Meyer at once sketched with a piece of charcoal the objects of natural scenery about the abbey which seemed to him worthy to be included in the frescos; and the abbot, impressed with his facility and fertile invention, employed him to carry out in fresco the charcoal sketches. Thenceforward his work received the patronage of the nobility. In the last years of his life he assumed a new manner in his pictures, and his productions in this later manner are by no means equal to his earlier work.

MEYER, HEINRICH AUGUST WILHELM, TH.D., 1800–73; b. Gotha. In 1831 he appeared as an exegetical commentator on the New Testament, displaying sound learning and acute criticism, combined with evangelical sentiments. His commentaries are highly esteemed. Besides his commentaries, he edited an important work on the evangelical confession, and preached for many years in the church at Hanover. An English translation of his commentaries is now publishing at Edinburgh, under the direction of Drs. W. P. Dickson, of the university of Glasgow, and F. Crombie, of St. Mary's college. Those on Galatians, Romans, and the Gospel of John have already appeared. Their value is very great.

MEYER, JEAN GEORGE (MEYER VON BREMEN), b. in Bremen, 1813; student 1833–42 in the art school of Düsseldorf, where he opened a studio. His first productions were religious works of large size, but the spirit of Meissonier soon possessed him, and he commenced that series of domestic subjects on diminutive canvas of which the exquisite finish and natural pathos have made his name a household word on two continents. In 1852 he established himself in Berlin, and so great has been the demand for his pictures that they have generally been sold into private hands before they could be placed in the great exhibitions. Their usual small size, and lively tone as well as delicacy of finish, make them peculiarly valuable as parlor pictures. Among his well-known paintings are "The Widow's Evening Prayer with Her Children," which has been engraved; "Inundated;" "The Return of the Soldier of the Landwehr," also engraved; "The Very Small Brother," engraved; "The First Prayer," engraved; "The Repentant Daughter;" "Grandfather's Visit;" "Fisherman's Children." The first named and "The Very Small Brother" were exhibited at the Paris exposition of 1855. A considerable number of his paintings are now in the United States.

MEYER, JOHANN HEINRICH, 1759–1832; b. Switzerland; studied painting at Zürich, under Füssly, brother of the well-known royal academician, Henry Fuseli.

In 1784 he went to Rome, where he met Goethe, with whom he contracted a friendship so intimate that he was known in Germany by the name of "Goethe-Meyer." After spending some time in Venice, Naples, and other Italian cities, he returned to Zürich in 1787. He made at Naples the acquaintance of Tischbein, and of Herder, who was making a tour of Italy as an *attaché* in the service of the duchess of Weimar. In 1792 he visited Goethe at Weimar, and was appointed to a professorship in the Weimar school of design. Three years later he revisited Italy, again passing much of his time at Naples and Florence. In 1797 he returned to Weimar, which became henceforth his home. He was on intimate terms with the court and the literary men and scholars at Weimar. He was honored with the title of *Hofrath*, and in 1807 was made a director of the academy there. He continued his intimacy with Goethe, who consulted him on all matters of art; and many of the critical portions of Goethe's works on art, such as *Kunst und Alterthum*, and *Winckelmann und sein Jahrhundert* are to be credited to Meyer. As a painter, his production was scanty. There is an allegorical frieze by him in the palace at Weimar, and he left a few water-colors, for the most part sketches from ancient works of art. It was as a writer on the history and theory of art, and particularly of Greek and Roman art, that he acquired authority. He published, with extensive annotations of his own, the works of Winckelmann. These notes he subsequently expanded into a general history of Greek art, which appeared at Dresden in 1820, under the name of *Geschichte der Bildenden Künste bei den Griechen*. A third volume of this work was published by Reimer, after Meyer's death, as *Geschichte der Bildenden Künste bei den Griechen und Römern*.

MEYERBEER, JAKOB, commonly called GIACOMO MEYERBEER, a celebrated musical composer of the present age, was the son of a wealthy Jewish banker, and was b. at Berlin, Sept. 5, 1794. He was a precocious child, playing tunes on the piano spontaneously (it is said) as early as his fifth year. He began to study dramatic composition under Bernhard Anselm Weber; and in 1810 entered the school of Vogler at Darmstadt, where he formed an intimate friendship with the renowned Karl Maria von Weber. While at Darmstadt, he wrote a cantata, *Gott und die Natur*. Subsequently, he composed an opera, *Jephthah*, produced at Munich in 1812; but though warmly admired by his friends, Vogler, Weber, and others, it fell flat on the audience, and was considered a failure. He now proceeded to Vienna, where he acquired a brilliant reputation as a pianist; but another opera which he produced here by command of the court, *Die beiden Khalifen*, was no more successful than the previous one. Italian music was the rage at the time, and nobody had a chance who did not imitate Rossini. Meyerbeer was induced by his friend Salieri to visit Italy, where he became an enthusiastic convert to the new Italian school, and began the composition of a series of operas which proved highly popular. We may mention his *Romilda e Constanza* (performed at Padua in 1819), *Semiramide* (Turin, 1819), *Emma di Resburgo* (Venice, 1820), the first of Meyerbeer's compositions that excited a furor; *Margherita d'Anjou* (1822), *Esule di Grenada* (1823), and *Crociato* (Venice, 1825). The last of these afforded, perhaps, the most decisive proofs of the high genius of its author, and was received with great applause in Paris, whither Meyerbeer now proceeded, and took up his residence. In 1831, was produced, after numerous rehearsals, his *Robert le Diable*, which caused an excitement "perhaps unparalleled in the history of the Parisian stage;" while it was received with nearly as great enthusiasm in England, Italy, Austria, and Russia; and in 1836, *Les Huguenots*, in which he reached the climax of his fame. His next opera, *Le Prophète* (1849), fairly sustained his reputation. It was followed by *Pierre le Grand* (1854), *Dinorah* (1858), and *L'Africaine* (1865). Meyerbeer died May 2, 1864.

MEYERS, a co. in s. central Dakota; drained by the s. fork of White river and by the Keyapaha which separates it on the s. from Nebraska; 1400 sq.m.; pop. '80, 115—29 of foreign birth. The soil is undulating and broken. As the country is very sparsely settled, there is little agriculture and no manufacturing.

MEYR, MELCHIOR, 1810—71; b. Germany; educated at Munich and Heidelberg. He made his first appearance as a poet, at the age of 25, and as a prose writer three years later. His most important works are *Stories from the Ries*, 1856–60; *God and his Kingdom*, 1860, with its sequel, *Emilia*, 1863; *Charles the Bold*, 1862; and *Talks with an Oaf* (*Grobrian*), 1866.

MEYRICK, FREDERICK, b. England, 1826; educated at Trinity college, Oxford, of which he was successively scholar, fellow and tutor; graduated in 1847, and has held the university offices of select preacher and public examiner. In 1856 he was appointed one of the queen's Whitehall preachers, in 1859 inspector of schools, and in 1869 became rector of Blickling with Erpingham in Norfolk. He was the chief agent in establishing the Anglo-Continental society for making known the principles of the English church in foreign countries, and published several controversial treatises in Latin, Spanish, Italian, etc. He is the author of *Practical Working of the Church in Spain; The Moral Theology of the Church of Rome; The Outcast and Poor of London; The Wisdom of Piety; But isn't Kingsley Right after All?; On Dr. Newman's Rejection of Liguori's Doctrine of Equivocation*. He has contributed also to Dr. Smith's *Dictionary of the Bible*, and to the *Speaker's Commentary* edited by Canon Cook.

MEYRICK, Sir SAMUEL RUSH, LL.D., 1783–1848, b. England; educated at Oxford. He married at the age of 20, against the wishes of his father, who disinherited him. In 1810 he published *The History and Antiquities of the County of Cardigan.* He was now called to the bar, and practiced law in the ecclesiastical and admiralty courts. In 1814, in association with capt. Charles Hamilton Smith, he published a book on the *Costume of the Original Inhabitants of the British Islands.* But his chief antiquarian work did not appear till 1824, under the title of *A Critical Enquiry into American Armor,* in 3 vols. 4to. He assisted rev. T. D. Fosbroke, in 1825, in the publication of *The Encyclopædia of Antiquities.* In the next year, he arranged the arms and armor in the Tower of London, and two years later, he performed the same service at Windsor castle, at the request of George IV. He was knighted by William IV., in 1832. He had already built near Goodrich castle on the Wye, a house called Goodrich court, arranged to exhibit his collection of armor, an account of which is to be found in Joseph Skelton's *Engraved Illustrations of Ancient Armor.* In 1836 sir Samuel furnished the text to Henry Shaw's *Specimens of Ancient Furniture.* His last important publication was *Lewis Dunne's Heraldic Visitation of Wales,* which appeared in 1846.

MEZEN, or MEZENE, a river in the n. of European Russia, rises in the n. of the government of Vologda, and flows n.w. into the White sea, having a course of about 450 miles.

MEZEN, or MEZENE, a district t. in the government of Archangel, European Russia, 50 m. from the mouth of the river of the same name, remarkable for the salmon and herring fisheries which supply St. Petersburg with frozen fish during winter. Pop. '67, 1746.

MEZERAY, FRANCOIS EUDES DE, 1610–83; b. in Séez, France; educated in the university of Caen; was for a time in the commissary department of the army. Its labors proving distasteful, he commenced writing in light literature, and perceiving that historical literature was not of a high order at that time, conceived the notion of supplying the want. His labors attracted the attention of Richelieu. The first vol. of his *History of France* appeared in 1643 in quarto, illustrated. Industrious, independent, and supercilious towards his predecessors, he produced a work that placed him temporarily at the height of fame. Richelieu sustained him. In 1651 he had published the 3d vol., and been made a member of the academy. His style is vigorous and original, and though far less thorough than modern historians, "his sagacity often supplies his lack of knowledge." After the *History of France* was completed, he made a translation of "*The History of the Turks*" by Chalcondyle. During the wars of the Fronde he mingled in the wordy war of pamphlets, poems, madrigals, and satires, with a profuse pen, distinguished more by its grossness than its wit; and largely aimed at cardinal Mazarin and his *belles nièces.* For the history of France in the 16th c., which was near to him, he is still the highest historical authority of his time.

MEZEREON, the bark of *daphne mezereum,* Lin.; *daphne gnidum,* Lin.; and *daphne laureola,* Lin. Natural order *thymelaceæ.* These three plants are small shrubs from 2 to 4 ft. high. *Daphne mezereum* has rose-red, sessile, fragrant flowers, in small clusters, preceding the deciduous leaves. It is indigenous to hilly and mountainous regions of Europe, extending to the Arctic circle and eastward to Siberia. The other two species grow in southern Europe, *D. laureola,* spurge laurel, has large evergreen leaves and yellowish-green flowers in axillary clusters. *D. gnidum,* spurge flax, has narrow, annual leaves, and small white flowers in terminal racemes. Mezereon bark occurs in commerce in long bands about one-half an in. wide and one-twentieth an in. thick, folded and tied together in bundles, or rolled up into flat disks. The dried bark is inodorous, but has a persistently acrid and burning taste. The bark of *D. gnidum* is darker, and that of *D. laureola* is more gray and has a greenish bast. They resemble mezereon in acridity. The root bark of the three species is the strongest, but the stem bark is the more common. It is used as an adjunct to sarsaparilla in making the compound decoction and the compound extract of that drug. Ancient and modern authorities assign to mezereon irritant qualities, and it was long ago used as an emetic, purgative, cholagogue, emmenagogue, and sudorific. It has produced narcotism and convulsions, acrid and blood-red urine, and death has sometimes followed its experimental use on animals. In medicinal doses the decoction causes salivation and increased cutaneous and mucous secretions, described as having a peculiar odor. A case is recorded of a girl upon whose cheek the fresh juice had been rubbed. This was followed by a vesicular eruption, fever, internal disorders, and after a period of nine months, death. Notwithstanding this, it is still used as a local irritant in the form of the juice, and that of an ointment. It once had a reputation for curing skin diseases.

MEZIERES, a fortified t. of France, capital of the department of Ardennes, on a bend of the Meuse, which washes its walls on two sides, and separates it from Charleville (q.v). It was strongly fortified by Vauban, and is defended by a citadel. It communicates with Charleville by a suspension-bridge. In 1815 the town held out for two months against the allies, who besieged it after the battle of Waterloo. Over the n. aisle of the church is a bomb-shell, which has been sticking there ever since the town capitulated. In 1520 the chevalier Bayard, with 2,000 men, successfully defended it against 40,000 Spaniards under Charles V. In the Franco-German war of 1871 Mezieres capitulated after a cannonade of two days. Pop. '76, 5,204.

MÉZIERÈS, ALFRED, b. at Rehon on the Moselle in 1826; educated in Paris; professor of foreign literature at Nancy in 1854, and afterwards assistant professor of the same in Paris. Among his published works are *Memoire sur le Pelion et l'Ossa*, 1853; *Shakespeare, ses Œuvres et ses Critiques*, 1861; *Prédécesseurs et Contemporains de Shakespeare*, 1863. The last two works were crowned by the French academy. *Contemporains et Successors de Shakespeare*, 1864; *Dante et l'Italie Nouvelle*, 1865; *Charades et les Homonymes ou l'Art de s'Instruire en s'Amusant*, 1866; *Petrarch*, 1867; and *Recits de l'Invasion, Alsace et Lorraine*, 1871.

MEZÖ-TUR, a t. of Hungary, on the Berettyo, an affluent of the Köros, 60 m. s w. of Debreczen. Pottery is made, and there is an important market. Pop. '67, 20,447.

MEZQUITE, the name of two Mexican trees or shrubs, of the natural order *leguminosæ*, suborder *papilionaceæ*, bearing pods filled with a nutritious pulp. The COMMON MEZQUITE (*algarobia glandulosa*) is a small shrub, with stems often decumbent, and armed with strong straight spines. It is found in great profusion throughout vast regions, chiefly consisting of dry and elevated plains. In dry seasons it exudes a great quantity of gum (*gum mezquite*), similar in quality to gum-arabic, which seems likely to become a considerable article of commerce, and which has begun to be exported to San Francisco from the Mexican ports on the Pacific.—The CURLY MEZQUITE or SCREW MEZQUITE (*strombocarpa pubescens*), also called SCREW BEAN and TOURNIL, although only a shrub or small tree, is of great value in the wild and desert regions of the western part of North America, where it occurs along with willow bushes near springs of water. Its wood is used as fuel, and the pulp of its pods for food. The pods are spirally twisted into compact rigid cylinders, from an inch to an inch and a half in length.

MEZZO signifies middle, or mean, and is generally used in music in conjunction with some other word, as mezzo-forte—moderately loud; mezzo-piano—rather soft; mezza-voce—with a moderate strength of tone; mezza-orchestra, with half the orchestra, etc. When written alone and applied to the grand piano-forte it denotes that the pedal is to be used, avoiding one of the sets of strings

MEZZOFANTI, GIUSEPPE, Cardinal, a remarkable linguist, was b. Sept. 17, 1774, at Bologna, where he received his education, and subsequently (1815) received the office of university librarian. In 1831 he settled in Rome, and was advanced to the dignity of monsignore; in 1833 he was appointed secretary of the college of the propaganda; then keeper of the Vatican library, and in 1838 he was raised to the dignity of cardinal. He died Mar. 15, 1849, at Rome. Mezzofanti's European reputation was founded not on any literary or learned works that he wrote, but on the almost miraculous extent of his linguistic acquisitions. Towards the end of his life he understood and spoke fifty-eight different tongues. As early, indeed, as 1820 lord Byron called him "a walking polyglot, a monster of languages, and a Briareus of parts of speech." He was not in the strict sense a critical or scientific scholar; yet, although his linguistic skill lay chiefly in verbal knowledge, his acquirements in other departments were by no means inconsiderable. See Russell's *Life of Cardinal Mezzofanti* (Lond. 1858).

MEZZOJU'SO (Arab. *Menzil-Jussuf*, village of Joseph), a t. of Sicily, in the province of Palermo, 18 m. s.s.e. of Palermo city. It is one of the four colonies of Albanians who, on the death of Scanderbeg, in the 15th c., fled to Sicily to avoid the oppression of the Turks. They preserve their language to a great extent, and follow the Greek ritual, their priests being allowed to marry; but, except on fête-days, they are not to be distinguished in feature or dress from the peasantry of the rest of Sicily. Pop. 5,700.

MEZZOTINTO, a style of engraving on copper and steel which was very popular during the first half of the 19th c. in England and America, being applied to reproduction of works of the masters; and also to the illustration of subjects for the class of gift-books known as "annuals," and which were greatly in vogue between 1820 and 1860. In this style of engraving, which essentially differs from every other, the surface of the plate is first indented or hacked all over by the action of an instrument something like a chisel, with a toothed or serrated edge, called a cradle, or mezzotinto grounder. This tool, being rocked to and fro in many directions, indents or barbs the plate uniformly over its face, and produces what is called the mezzotinto grain or ground. The barb or nap thus produced retains the printing-ink; and if in this state of preparation an impression were taken from the plate upon paper, it would be uniformly of a deep black color. The directions, or *ways*, as they are technically called, given to the grounding-tool are determined by a regulated plan, and for this purpose an ingenious sort of scale is used which enables the workman to pass over the plate in almost any number of directions without repeating any one of them. The mezzotinto ground being thus laid, it is at this period that the business of the artist properly commences. Having traced or drawn, with a pencil or other instrument, his outline upon the paper (unless, as is sometimes the case, this should have been etched by the ordinary process previous to the mezzotint ground having been laid), he proceeds to remove the nap or ground, in conformity with the design, from all those parts which are not intended to be perfectly black in the impression. The instruments required for this purpose are scrapers and burnishers; with the former he scrapes away more and more of the ground in proportion to the brightness of the light, and the burnishers are used to produce perfect whiteness

where it is required, as the high lights on the forehead or tip of the nose, or white linen in a portrait, etc. As the work proceeds it may be blackened with ink, applied with a printer's ball or otherwise, to ascertain the effect; after which the scraping may again be proceeded with, the artist taking care always to commence where the strongest lights are intended to appear. The great facility with which mezzotinto engraving can be executed, as compared with line-engraving, was the principal cause of its popularity in the days of the height of its success. But it also possesses peculiar advantages of richness of color, capacity for broad contrast of light and shade, and mellowness of tone, which adapt it for certain classes of work, and, in its proper place, enable it to produce effects not otherwise attainable. The richness and depth of the shadows in this kind of engraving are measurably balanced, however, in the corresponding poverty of the lights. Where these occur in masses in mezzotinto-engraving the effect is cold and unsatisfactory. At first copper was used in the production of mezzotinto-engraving, but steel plates eventually superseded them, on account of the greater scope which its hardness afforded to the tools employed, and also the very much larger capacity for impressions of steel plates. The legend which associates the name of prince Rupert with the discovery of the art of mezzotinto-engraving is an interesting one; and, as the Italians say, *si non e vero, e ben trovato.* It is said that the prince observed one morning a soldier engaged in cleaning his musket, removing from it the rust which the night-dew had occasioned; and perceiving upon it, as he thought, some resemblance to a figure, it occurred to him whether or not, by corroding or grounding plate all over in a manner resembling the rust, he might not afterwards scrape away a design upon it, from which impressions might be obtained. It is alleged that he succeeded, and thereby accomplished the invention. Unfortunately for the claim set forth in behalf of prince Rupert, it has been proven groundless, and the prince is accused of having learned the art from its original inventor or discoverer. This was Louis von Siegen, a lieut.col. in the service of the landgrave of Hesse-Cassel, and his first work which was published was a portrait of the princess Amelia-Elizabeth of Hesse, proofs of which before letter bear the date 1642, or fifteen years anterior to the earliest of prince Rupert's dates. This method of illustration was not only adopted by sir Joshua Reynolds, but even employed in so important a work as Turner's *Liber Studiorum.* In the United States the mezzotinto style was a favorite with magazine publishers in the early days of that kind of literature, being introduced from England by John Sartain, an expert mezzotint engraver, in 1830. He published *Sartain's Magazine,* illustrated after this fashion. See ENGRAVING.

MGLIN, a t. of Russia, in the government of Tchernigov, 125 m. n.n.e. of the town of Tchernigov. There is a large cloth-factory, and a considerable number of German families. Pop. '67, 5,842.

MHENDIGUNJ, a t. of British India, in the territory of Oude, 90 m. s.e. of Lucknow, 3 m. s. of the right bank of the river Saee. It is a busy, thriving place, with a population estimated at 20,000.

MHOW, a t. of British India, in the territory of Indore, 13 m. s.w. of the town of Indore, near the Vindhyan mountains, on an eminence on the Gumber river. Near it are the cantonments, which have altogether the appearance of a European town, having a church with steeple on an eminence, a spacious lecture-room, a well-furnished library, and a theater. They are situated at an elevation of 2,019 ft. above the sea, and are occupied by a considerable force. On the 1st of July, 1857, the sepoys mutinied here during the great rebellion of that year.

MIA'CO. See MIAKO.

MIAGAO, a t. in the island of Panay, one of the Philippine isles, in the province of Iloilo. The inhabitants, who are industrious, comfortable, and well educated, are estimated at 31,000 in number.

MIA'KO, or KIOTO, now called SAI-KIYO; the ancient capital of Japan, situated in the s.w. of the island of Nipon. Broad and clean streets cross each other at right angles, and the houses are mostly of the better class. During the double rule in Japan it was the residence of the mikado, then only the spiritual emperor, and was and is the stronghold of the national religion. Some of the temples are of great size and splendor. In 1868 the great revolution broke out; the shogun, or temporal ruler, was deposed; and the mikado, who was now invested with complete authority, both temporal and spiritual, removed his court to Yedo. Most of the aristocratic dwellings are consequently tenantless, and the population in 1876 was only 374,496. Miako is still, however, the seat of considerable trade with the interior. It is also a center of Japanese literature and art, and is well provided with public schools for boys and girls. It is famed for the manufacture and dyeing of silks. Miako is connected by railway with Osaca and Hiogo.

MIALL, EDWARD, b. England, 1829; educated at the Protestant dissenters' college in Wymondley, Herfortshire, where he studied for the ministry. He was for three years a minister of the Independent church at Ware, and was afterwards settled in the same capacity at Leicester. In 1841 he left Leicester for London, where he established the *Nonconformist,* which he still owns and edits, and which remains the chief organ of the English dissenters. He contested, unsuccessfully, a seat in parliament in 1845 and 1847;

but was returned from Rochdale in 1852. He was defeated in 1857, but sat for Bradford from 1869 to 1874. He is a leader of the movement for the disestablishment of the English church, and a supporter of universal suffrage. The adherents of the views which he represents gave him, in 1873, a purse of £10,000 in recognition of his services as editor and member of parliament in behalf of complete civil and religious equality. He has written a number of works in support of his ideas—*Views of the Voluntary Principle*, published in 1845; *Ethics of Nonconformity*, 1848; *The British Churches in Relation to the British People*, 1849; *Title-Deeds of the Church of England to her Parochial Endowments*, 1861. Of a less polemical character is his *An Editor off the Line; or Wayside Musings and Reminiscences*, 1865.

MIA'MI, a river of Ohio, United States of America, rises by several branches in the western center of the state, and after a s.s.w. course of 150 m. through one of the richest regions of America, and the important towns of Dayton and Hamilton, empties itself into the Ohio river 20 m. w. of Cincinnati. It is sometimes called the Great Miami, to distinguish it from the Little Miami, a smaller river, which runs parallel to it, 15 to 25 m. e., through the Miami valley.

MIAMI, a co. in n. Indiana, crossed centrally by the Wabash and Erie canal, the Evansville and Terre Haute railroad, the Eel River railroad, and the Indianapolis, Peru and Chicago, and Pittsburg, Cincinnati and St. Louis railroads; 380 sq.m.; pop. '80, 24,083—22,843 of American birth, 240 colored. It is drained by the Wabash, Eel, and Mississinewa rivers, and Pipe creek. Its surface is generally level, the banks of the rivers rising much higher than the interior plains; a large proportion being covered with hard wood forests, oak openings, and groves of sugar-maple trees. Its soil is fertile, especially the bottom lands, producing tobacco, wool, Irish and sweet potatoes, wine, dairy products, hops, flax, maple sugar, sorghum, honey, and grain. Stock raising is extensively carried on, and there is much valuable water power. Its manufactories include a brewery, woolen factories, cabinet-making establishments, and manufactories of carriages, lumber, furniture, cigars, agricultural implements, etc. Seat of justice, Peru.

MIAMI, a co. in e. Kansas, having the state line of Mississippi for its e. boundary; intersected centrally by the Kansas City, Fort Scott and Gulf railroad, and the Osage branch of the Missouri, Kansas and Texas, forming a junction at Paola; 600 sq.m.; pop. '80, 17,818—16,677 of American birth, 902 colored. Its surface is undulating and spreads out into broad prairies with a small proportion of woodland. It is drained by the Osage river, or Marais des Cygnes, and Peoria, Wea, and Pottawatomie creeks. Live stock is raised, and the fertile soil produces Indian corn, oats, wheat, potatoes, wool, and the products of the dairy. Limestone is the foundation of the soil, and it contains beds of bituminous coal; petroleum is also found. Among its manufactories are carriage shops, and it has saw-mills, and wind-mills for grain. Seat of justice, Paola.

MIAMI, a co. in s.w. Ohio, intersected by the Great Miami river, and drained by Greenville and Stillwater creeks; 400 sq.m.; pop. '80, 36,178—34,039 of American birth, 1,176 colored. It is traversed by the Dayton and Michigan railroad, and the Columbus, Chicago and Indiana Central railroad, crossing it centrally, and forming a junction at Piqua, and the Miami and Erie canal, following the general course of the Dayton and Michigan railroad, and the Great Miami river. Its surface is undulating and well wooded, particularly in the e. portion. It has limestone quarries in the w., and the soil having generally an under-stratum of Silurian limestone, is very fertile, and produces large quantities of fruit, grain, tobacco, wool, Irish and sweet potatoes, dairy products, flax, maple sugar, sorghum, and honey. Live stock is an important commodity. The extensive hydraulic power of the river is utilized, and its trade in grain is considerable. Among its manufactories are tanneries, distilleries, breweries, spring-wagon and wheel works, machine shops, and oil mills; other manufactures are carriages, furniture, wool, clothing, brick, and metallic wares. Seat of justice, Troy.

MIAMIS, a tribe of Indians of the great Algonquin family, and whose habitat was in the neighborhood of Green bay (Wisconsin) as early as 1658, when they were found there by the French. They were also discovered in 1670 about the Fox river, to the number of 8,000, and disclosing social and tribal conditions of a more elevated character than those usual among the tribes so far north. They occupied a village of houses made of matting, and surrounded by a palisade; and their chief displayed several of the adjuncts of rank and authority. Later, this tribe was collected on the St. Joseph's river, and in 1683 they were at war with the Sioux and the Iroquois at the same time, being aided by the Illinois, who were friendly to them, in their struggle with the latter. They afterwards became inimical to the French, and made overtures to the English, being by this time engaged in a war with the Hurons, and threatening the Chippewas. The Miamis were in fact a warlike tribe, and not a little aggressive. In 1705 the French brought about a war between them and the Ottawas. Finally, when the French and English war broke out, they were in doubt to which side to ally themselves, but generally supported the English and made depredations on the French. Yet when the French were driven out of that part of the country the Miamis united with Pontiac in the capture of the British forts, St. Joseph's and Miami: and when the American revolution began they opposed

the patriots and sided with the English. After the close of the revolutionary war they continued to oppose the settlement of the country by the whites, and in 1790 it was found necessary to send a force against them under gen. Harmer. A series of battles, in which success veered from one side to the other, failed to effect a reconciliation, and hostility continued until 1795, when peace was made. In 1790 they had been able to put in the field only about 1500 warriors, and after the peace they rapidly dwindled in numbers and importance. They now ceded lands between the Wabash river and the Ohio state line, but the new mode of living imposed upon them by the nature of the annuity system completed their degradation. Their naturally warlike and energetic character succumbed to the inroads effected by an idle life and facility for obtaining intoxicating liquors; and though they broke into action and attacked the whites on one or two occasions, their ancient spirit had deserted them, and these conflicts availed them nothing. In 1822 their entire number amounted only to between two and three thousand, living on three different reservations. They gradually ceded all their lands to the U. S. government, and in 1846 they were removed to the neighborhood of the fort Leavenworth agency. They then numbered only 350 souls, and were dissipated and wretched in the extreme. About the year 1873 the remains of this once powerful tribe, 150 in number, were finally placed on the Quapaw reservation.

MIANTONOMOH, the name of a sachem of the Narragansett tribe of Indians, who succeeded his uncle, Canonicus, in 1636. He was on friendly terms with the early settlers of Massachusetts, and assisted them during the Pequot war. In 1642 he conducted an expedition against Uncas, the Mohegan chief, but was unsuccessful, and was captured at Norwich, Conn. Uncas surrendered him into the hands of the commissioners of the united colonies, and his execution being advised by them, he was tomahawked on the spot where he was captured, known as Sachem's plain, and where a monument in commemoration of the event was set up in 1841.

MIAS'MA (Gr. pollution; in the plural, *Miasmata*), or MALARIA. It is proved by the experience of all ages that there is an intimate connection between marshy districts and certain diseases, especially the various forms of intermittent and remittent fever; but the exact nature of the noxious agent, and the circumstances on which its formation and extrication depend, are even at the present day not altogether established. It is clearly neither heat nor moisture, for the crews of clean ships, when cruising in the tropics at a distance from land, are usually very healthy; nor is it any known gas extricated from the marsh, for the gases collected by stirring up marshes (carbonic acid, nitrogen, oxygen, and carbureted hydrogen) may be inspired without giving rise to any symptoms resembling those produced by malaria. It may be regarded as an established fact that the noxious agent is a product of vegetable decomposition occurring under certain conditions of heat and moisture. That vegetable decomposition is the source of the poison is inferred from various circumstances. For example, this special morbific influence is nowhere so powerful as in the deltas and along the banks of large tropical rivers which, in their flood, bring down the washings of the soil, full of vegetable remains, which, upon the subsidence of the waters, are left reeking in the hot sun. Again, the poison has been traced, in various places in Italy, France, and the Netherlands, to the practice of steeping flax in stagnant waters, and even in streams, and in India it was formerly the custom, after extracting the coloring matter, to throw the remains of the indigo into large heaps which, in the course of three years, became excellent manure; it was found, however, that these heaps, alternately soaked by the heavy rains and heated by a tropical sun, decomposed and emitted miasmata precisely similar in their effects to those produced by marshes. Marsh-miasmata are seldom evolved at a temperature under 60°, but at and above 80° they are prevalent and severe; and the nearer we approach the equator, the more violent, as a general rule, do they become. Although moisture is necessary to the evolution of miasmata, an excess of it often acts as a preventive, and by impeding the access of atmospheric air retards or prevents decomposition. This explains the apparent anomaly of an uncommonly rainy season producing opposite effects in different localities, sometimes not far distant from one another. Thus in the West Indies a very rainy season induces general sickness in the dry and well-cleared island of Barbadoes; while at Trinidad, whose central portions are "a sea of swamp," and where it rains nine months in the year, the excessive rain is a preservative from sickness; for in the seasons when the rain falls only eight months or less, the swamps become dry and exposed to the sun, and severe remittent fevers are sure to follow.

Chemistry has hitherto failed in detecting any special ingredient to which the air evolved by marshes owes its poisonous qualities. The air collected in the most poisonous districts gives, on analysis, the same gases existing in the same proportions as normal air, nor (if we except the observations of Boussingault, which have not been confirmed by other chemists) does it give evidence of the presence of any organic body.

The infecting distance of this poison is a subject of great practical importance; and both the altitudinal range and the horizontal spread have to be noticed. In Italy it is estimated that an altitude of about 1,500 ft. assures an exemption from marsh-poison; while in the West Indies an elevation of at least 2,000 ft. is necessary. From observations made by sir Gilbert Blane during the ill-fated Walcheren expedition, it appears that in Europe the horizontal spread of marsh-miasmata over fresh water is less than

3,000 ft.; but over salt water—at all events, in the tropics—the horizontal range is greater. The extent to which the poison may spread horizontally over land is a much more complicated question, and depends, to a great extent, upon the nature of the soil. The effect of trees in intercepting miasmata is very remarkable, and is probably due partly to their condensing the vapors of the marsh, and partly to their altering the direction of the current of air. Pope Benedict XIV. caused a wood to be cut down which separated Villatri from the Pontine marshes, and in consequence, for many years, there was a most severe and fatal fever in a district previously healthy; and the same results have in many other cases followed the removal of trees.

In districts where this poison exists it is found by experience that those who go out of their houses only during the day, after the morning fogs have dispersed, and before the evening mists appear, often escape the bad effects; and a full meal, with a few grains of quinine, should be taken before exposure to the morning air by travelers in a malarious district.

Dr. Wood of Philadelphia has pointed out the extraordinary and very important fact, that miasmata are neutralized, decomposed, or in some other way rendered innocuous by the air of large cities. Though malarious diseases may rage around a city, and even invade the outskirts, yet they are unable to penetrate into the interior, and individuals who never leave the thickly-built parts almost always escape. What it is in the air of the city which is thus incompatible with malaria, is unknown; but very probably it is connected with the results of combustion, for the fire and smoke of camps are asserted to have had the same effects. See MALARIA.

MIAULIS, ANDREAS VOKOS, 1770—1835, b. Greece; adhered to the Greek revolutionists in 1821, and the next year, was put in command of the Greek fleet. In March of that year, he defeated a Turkish squadron at Patras, and in September, another squadron near Spezzia. In 1825 he burned the fleet commanded by Ibrahim Pasha near Modon. He left the service in 1827, upon the appointment of lord Cochrane, as his superior in command. He was soon restored to his old rank, and stationed at the harbor of Poros. He participated in the insurrection of 1831, and burned the fleet under his command at Poros, to keep it out of the hands of the Russians. He was indicted for treason, but the proceedings came to nothing. In 1832 the naval stations in the Archipelago were placed in his charge. Soon after, he was made vice-admiral.

MIAUTSÉ, the aborigines or hill-tribes of China. From the dawn of Chinese history, we find the people of the plains contending against those of the high lands, and to the present day the hardy mountaineers have maintained their independence. They consist of numerous tribes, occupying large portions of Kwang-se, Kwei-chow, Yun-nan, Sze-chuen, and adjacent provinces. Some of them own Chinese sway; other tribes are absolutely independent. They are smaller in size and stature, and have shorter necks, and their features are somewhat more angular than the Chinese. Their dialects are various, and wholly different from the Chinese. Dr. Macgowan describes them as skillful in the manufacture of swords. He has shown that the Miautse of Western China and the Karens or hill-tribes of Burmah are identical.—Reports of Dr. Macgowan's Lectures.

MIA'VA, a market-town of North-west Hungary, on the Miava, an affluent of the Morava, 48 m. e.n.e. of Presburg city. There are manufactures of woolen cloth and bagging, and hemp and flax are cultivated. Pop. '69, 9,637.

MI'CA, (from the same root with Lat. *mico*, to glitter), a mineral consisting essentially of a silicate of alumina, with which are combined small proportions of silicates of potash, soda, lithia, oxide of iron, oxide of manganese, etc., according to which and the somewhat varying external characters, numerous species have been constituted by mineralogists. COMMON MICA, also called POTASH MICA, contains a notable but variable proportion of silicate of potash; it contains also a little fluorine. It is a widely diffused and plentiful mineral, entering largely into the composition of granite, mica-slate, and some other rocks, veins and fissures of which it also often fills up. It has a strong, and often almost metallic luster. It is remarkable for the readiness with which it splits into thin elastic plates, which are generally transparent. The thinness and elasticity of these plates readily distinguish them from those of talc, and of the laminated variety of gypsum; they are also devoid of the greasy feel of talc. They are sometimes not more than one 300,000th part of an inch in thickness, are generally quite transparent, and are therefore much used in setting objects for the microscope. Plates of Mica of large size are also used in Siberia, Peru, and Mexico as a substitute for glass in windows. Large plates, often a yard in diameter, are found in these countries, and in Norway and Sweden. Mica is advantageously substituted for glass in lanterns, as it bears sudden changes of temperature better than glass, and in ships-of-war, as it is not liable to be broken on the discharge of cannon. Another use of Mica is for making an artificial avanturine; it is also employed in a powdered state to give a brilliant appearance to walls, and as a sand to sprinkle on writing. In the state of a very fine powder, it is known as *Cat's Gold*, or *Cat's Silver*, according to its color. It is usually colorless, but sometimes white, gray, green, red, brown, black, and rarely yellow, owing to the presence of iron, manganese, chrome, fluorine, etc., in its composition. It is sometimes found in beautiful crystals, which are generally rhombic or six-sided tables. LITHIA MICA, or LEPIDOLITE, contains lithia in small proportion. It is often of a rose color, or a peach-blossom color. It is

used for ornamental purposes. It is found in several places in Britain.—MAGNESIA MICA, or BIOTITE, contains about as much magnesia as alumina. It is often dark green.

MI'CAH, the sixth (third in the lxx.) of the twelve minor prophets (Micayahu: Who is like unto Jah ?), probably a native of Moresheth, prophesied during the reigns of Jotham, Ahaz, and Hezekiah, and was therefore contemporary with Isaiah, and Hosea, and Amos.—The BOOK OF MICAH is regarded as divisible into three parts, each commencing with "Hear ye," organically connected, however, with each other, and showing even a progressive development of idea in the mind of the writer. The destruction of Samaria (Israel), the danger and subsequent captivity of Judah; the wickedness of the rulers, the punishments that overtake the land, the glorious restoration of the theocracy; Jehovah's "controversy with his people" on account of their sins, his warnings, his exhortations, and his sublime promise of forgiveness, form the principal points of Micah's prophecies, which relate to the invasions by Shalmaneser, Sennacherib, the Babylonian exile, the return, and the re-establishment of the theocracy under Zerubbabel. The style of Micah is clear, vivid, concise, yet richly poetical; some passages, especially in the beginning and the last two chapters, are among the noblest in the Old Testament. The play upon words noticeable in Isaiah is also a marked feature of this writer.

MICAH, PROPHECY OF (MICAH, *ante*), after the heading contained in the first verse, is divided into three sections, each beginning with "Hear ye," I.—Chapters i. ii, addressed to all the people, describe the coming of the Lord in judgment on the transgressions of Israel and Judah, the doom of Samaria; and the march of the invaders of the land from Samaria south to Jerusalem; denounce luxury and covetousness as the sources of transgression, and condemn the false prophets for leading the people astray; foretell the banishment of the people into captivity and promise their return under the guidance of the Lord their king. II.—iii.-v., addressed to the heads and princes of the people, condemn their oppressive rapacity, and declare that as they had been deaf to the cry of the poor in their wrongs, they too shall call on the Lord but will not be heard. The false prophets also who had deceived others should themselves be made ashamed. As the judges, priests, and people had become mercenary in all their service all of them should be left destitute, Zion should be a ploughed field, Jerusalem heaps of ruins, and the temple height a forest. This second threatening of judgment is followed by a second and fuller promise of Messianic times when the mountain of the Lord's house should be exalted on the top of the mountains, all nations flow to it, and the peaceful reign of the Messiah be extended over all the earth. His birth in Bethlehem Ephratah is foretold, yet his being from everlasting also is affirmed; his government, it is declared shall be marked by divine strength and majesty, and his greatness be extended over all the earth. III.—vi., vii. The Lord, calling on the people the third time to hear, and on the mountains to be witnesses of the controversy, appeals to all his past government over Israel as approving his righteousness. The people, answering, complain that the burden of the sacrifices required is too great to be borne, and the Lord in reply says that he asks of them only to do justly, love mercy, and walk humbly with God. That they had failed to comply with these demands is shown by the treasures of wickedness found in their houses, by the scant measures used, the false balances, the deceitful weights. For these crimes punishments will be inflicted; the wheat, the oil, and wine shall be cut off. The prophet mourns the justice of the sentence, and acknowledges the guilt of all classes of the people who do evil with both hands earnestly, the best of them being sharp as briers and thorns. Yet he waits for the salvation of the Lord, triumphing in his pardoning mercy which will certainly be manifested and in his faithfulness which will perform all that he had promised with an oath to Abraham in the days of old.

MICA'LI, GIUSEPPE, 1776–1844, b. Italy; after prolonged travels, devoted himself to the study of archæology. His most important work is his *Italia avanti il Dominio de'Romani.* It was published under that title in 1810, and a revised edition, with extensive changes, appeared in 1832, as *Storia degli Antichi Popoli Italiani.* Raoul Rochette made a French translation of this work. Micali's last book was the *Monumenti Antichi,* which was issued the year of his death.

MICA-SCHIST is, next to gneiss, one of the most abundant of the metamorphic rocks (q.v.). It consists of alternate layers of mica and quartz, but is sometimes composed almost entirely of the thin and shining plates or scales of mica, and from this it passes by insensible gradations into clay-slate. The quartz occurs pure in thin layers like vein quartz. Garnets are in some districts abundant in this rock, making up a large proportion of the whole mass. Mica-schist is believed to be a highly altered shale or clay deposit, and the component minerals, including the garnets, to have been developed under the influence of metamorphic action from materials already existing in the unaltered strata. In many places the mica-schist has a finely corrugated or wavy structure.

MICASLATE, a variety of mica-schist (q. v) containing more clayey matter than that which generally passes under the name of schist, and also having the micaceous scales more finely divided, so that they are scarcely visible by the unaided eye. Practical geologists use the term to designate a condition midway between mica-schist and clay slate. *Hydromica schist,* or *slate,* is a thin schistose rock consisting principally of

hydrous mica, with occasionally more or less quartz, and having a greasy feel, like talc (q.v.); whitish to pale green, and darker, in color, pearly to glistening luster. It used to be called talcose slate, but contains no talc, as shown by Dr. C. Dewey. There are several varieties.

MICHAEL, THE ARCHANGEL, meaning in Hebrew, "*Who is like God,*" in Scripture a prince among the angels, whom the Divine Being, that appeared to Daniel in human form, described as a guardian of the Jewish people co-operating with him in their behalf, thwarting the efforts of their human adversaries and resisting also the schemes of Satan against them. This is in accordance with other Scripture teachings concerning the angel Jehovah as directing the history of Israel and concerning the angels as subject to him in the work of redeeming men. In the epistle of Jude Michael is called the archangel, and it is said concerning him that "when, contending with the devil, he disputed about the body of Moses, he durst not bring against Satan a railing accusation, but said, The Lord rebuke thee." Some interpret this passage as affirming a dispute about the literal body of Moses which the Lord buried in a sepulcher unknown to men. Others regard the "body of Moses" as a symbolical phrase for the Mosaic law and institutions, in accordance with the common usage among Christians in speaking of the church as the "body of Christ." In the book of Revelation, xii. 7–9, in language which is symbolical whatever its precise significance may be, it is declared that "there was war in heaven: Michael and his angels fought against the dragon and his angels, who prevailed not, neither was their place found any more in heaven. And the great dragon was cast out, that old serpent, called the devil and Satan, who deceiveth the whole world: he was cast out into the earth, and his angels were cast out with him." The nature and method of this war against Satan are not explained; the fact itself is revealed with that mysterious vagueness which hangs over all angelic ministration, but also with positiveness. In addition to what the Scriptures reveal concerning the archangel there are various legends connected with his canonization as a saint in the church of Rome, where his festival, called Michaelmas, is celebrated on Sept. 29. In legendary art he is represented as young and beautiful, winged, in armor, bearing the shield and lance, with his foot on the evil one, ready to pierce and bind him. An old English gold coin bearing his image was therefore called an "angel." Of such Shakespeare speaks, when he says of a rich man, "he hath a legion of angels" in his purse.

MICHAEL, the name of six emperors of Constantinople.—I. succeeded to the throne on the death of Stauracius, in 811, who conducted a war against the Bulgarians, and was a great and just monarch; he was deposed by Leo, the Armenian, a gen. in his service, 813, and retiring to a monastery, passed the remainder of his life in devotional exercises. —II. was born in upper Phrygia, of an obscure family, but was ennobled by Leo, the Armenian. The latter, however, appears to have become angered against him, and imprisoned and condemned him to death. His life was saved by the assassination of Leo, and Michael was crowned emperor, 820. He was cruel and arbitrary; and his attempt to force his subjects to celebrate the Jewish Sabbath and passover brought about a revolt on the part of his gen. Euphemius, who proclaimed himself emperor. The rebellious gen. was slain near Syracuse, in Sicily. Michael was surnamed "the stammerer." During his reign the Saracens of Spain wrested the island of Crete from the empire, and in 827 the Aglabite Saracens seized Sicily. Michael died, 829.—III succeeded his father, Theophilus, in 842, under the regency of his mother, Theodora, whom he compelled, with her daughters, to enter a convent. In his reign the Russians first appear as foes to the empire; and the foundation for the separation of the eastern and western churches was laid by a quarrel between the patriarch Photius and the pope Nicholas I. Michael was assassinated by Basil the Macedonian in 867.—IV. surnamed the Paphlagonian, from the place of his birth, was raised to the throne by the empress Zoe, who, on account of her infatuation for him, murdered her husband He was successful in wars against the Saracens and Bulgarians, but retired to a monastery, where he died in 1041.—V. succeeded the last-named, who was his uncle. Having exiled the empress Zoe, who desired to marry him, he was overthrown by the people, and after having his eyes put out, was sent to a monastery.—VI. succeeded the empress Theodora in 1056, but retained the throne only a year, when he was compelled to resign in favor of Isaac Comnenus, while he retired to a monastery. Michael VI. was surnamed Stratioticus, and with him the Macedonian dynasty became extinct, his successor being of the family Comneni.

MICHAEL, or MIKAIL, ROMANOFF. See ROMANOFF, *ante.*

MICHAEL VI., surnamed PALÆOLOGUS, emperor of Constantinople. See PALÆOLOGUS.

MICHAEL ANGELO (BUONAROTTI), who, in an age when Christian art had reached its zenith, stood almost unrivaled as a painter, sculptor, and architect, was born in 1474 at Chiusi, in Italy. He was of noble origin, having descended on his mother's side from the ancient family of Canossa, in Tuscany, while the Buonarotti had long been associated with places of trust in the Florentine republic. Michael Angelo learned the rudiments of painting from Bertoldo, a pupil of Domenico Ghirlandaio; and having been admitted

as a student into the seminary which was established by Lorenzo the Magnificent for the study of ancient art in connection with the collections of statuary in the Medicean gardens, he attracted the notice of Lorenzo by the artistic skill with which he had restored the mutilated head of a laughing faun, and was received into the palace of the Medici, where he spent several years. Lorenzo's death in 1492, and the temporary reverses which befell the Medici family in consequence of the incapacity of his successor, Piero, led Michael Angelo to retire to Bologna, whence he soon removed to Rome, whither his fame had preceded him. His earliest original works were a kneeling angel, executed for the grave of St. Dominic, at Bologna; the statues of Bacchus and David at Florence; and a magnificent group representing the *Mater Dolorosa*, which was placed in St. Peter's, at Rome. Next in order of time, and, according to some of his contemporaries, first in merit, ranks Michael Angelo's great cartoon for the ducal palace at Florence, which, together with the pendant executed by Leonardo da Vinci, has long since perished. This work, which represented a scene in the wars with Pisa, when a number of young Florentines, while bathing in the Arno, are surprised by an attack of the Pisans, showed so marvelous a knowledge of the anatomical development of the human figure, and such extraordinary facility in the powers of execution, that it became a study for artists of every land, and by its excellence created a new era in art. Pope Julius II. called Michael Angelo to Rome, and commissioned him to make his monument, which was to be erected within St. Peter's. Although this work was never completed on the colossal scale on which it had been designed, and was ultimately erected in the church of St. Pietro ad Vincula, it is a magnificent composition, and is memorable for having giving occasion to the reconstruction of St. Peter's on its present sublime plan, in order the better to adapt it to the colossal dimensions of the proposed monument. The pope insisted upon Michael Angelo painting with his own hand the ceiling of the Sistine chapel, and, although unwillingly, he began in 1508, and completed within less than two years his colossal task, which proved one of the most marvelous of his works. The subjects of these cartoons are taken from the book of Genesis, while between these and the representations of the persons of the Savior's genealogy are colossal figures of the prophets and sibyls. Michael Angelo's genius was too often trammeled by the unworthy tasks in which Leo X. and successive popes engaged him, the former having employed him for years in excavating roads for the transportation of marble from Carrara, and in other ignoble labors. The Florentines and Bolognese vied with the pontiffs in trying to secure his services; and to his skill as an engineer Florence was indebted for the plans of the fortifications by which she was enabled for a prolonged time to resist the attempts of the Medici to recover possession of the city after their expulsion from it. On the surrender of Florence, he returned to Rome, where his great picture of the last judgment was painted for the altar of the Sistine chapel. This colossal fresco, nearly 70 feet in height, which was completed in 1541, was regarded by contemporary critics as having surpassed all his other works for the unparalleled powers of invention and the consummate knowledge of the human figure which it displayed. After its completion, Michael Angelo devoted himself to the perfecting of St. Peter's, which, by the touch of his genius, was converted from a mere Saracenic hall into the most superb model of a Christian church. He refused all remuneration for this labor, which he regarded as a service to the glory of God. Michael Angelo died in 1563, at Rome, but his remains were removed to Florence, and laid within the church of Santa Croce. His piety, benevolence, and liberality made him generally beloved; and in the history of art, no name shines with a more unsullied luster than that of Michael Angelo.—See Vasari's *Vite de' Pittori* (English translation), and *Lives* by Duppa (1806), Harford (1857), and Wilson (1876).

MICHAEL BRADACIUS, the first Moravian bishop, at first a Hussite priest at Zamberg in the eastern part of Bohemia, in the middle of the 15th century. When the Moravian brethren left the national church and established a ministry of their own, Michael having joined them was sent with two other priests to a Waldensian colony on the frontier of Bohemia and Austria for the purpose of securing the episcopacy. They were consecrated the first bishops of the Bohemian brethren. A church council was organized of which Michael was constituted the president. After a while he resigned, and Matthias of Kunwalde became president.

MICHAELIS, JOHANN DAVID, one of the most eminent and learned biblical scholars of the 18th c., was b. on Feb. 27, 1717, at Halle, where his father, Christian Benedict Michaelis, a theologian and orientalist of some distinction, was a professor. After completing his studies at his native university he traveled in England and Holland, where he made the acquaintance of several celebrated scholars. In 1745 he became a professor of philosophy at Göttingen, and took an active part in the formation of a scientific association there. From 1753 to 1770 he was one of the editors of the *Göttinger gelehrten Anzeigen*, and for some years he filled the office of librarian to the university. During the seven years' war he was occupied in making preparations for an expedition of discovery in Arabia, which was afterwards made by Niebuhr. In the latter years of his life he was almost always in the professorial chair or at his desk He died on Aug. 22, 1791. Michaelis was a man of vast attainments in history and archæology, and his labors were of great importance in the departments of biblical exegesis and history. He may be

regarded as among the earliest of the critical school of German theologians, but he lived at too early a period to acquire anything like a consistent or systematic theory of the genesis of the Hebrew Scriptures. He loved to rationalize in details, and was never quite certain what to think about inspiration; at all events, he seeks constantly to prove how thoroughly human the Mosaic legislation was, though he does not exactly deny its claims to being considered a Divine revelation. Many of his pupils became professors, and disseminated his principles through the German universities.

Michaelis's chief works are his *Einleitung in die Göttlichen Schriften des Neuen Bundes* (2 vols. Gött. 1750; English by bishop Marsh); his *Mosaisches Recht* (6 vols. Frankf. 1770–75; English by Dr. Alexander Smith, 1814); and his *Moral* (3 vols. Gött. 1792–1823). See his *Lebensbeschreibung von Ihm Selbst Abgefasst* (Rinteln und Leip. 1793).

MICHAELMAS DAISY. See ASTER.

MICHAELMAS DAY, one of the English quarter-days for payment of rent by tenants —viz., Sept. 29. Michaelmas term is one of the four legal terms during which the English courts of law and equity sit daily for dispatch of business. It begins on the 2d and ends on the 25th of November. Michaelmas head court is the name given in Scotland to the annual meeting of heritors or freeholders of each county to revise the roll of freeholders, the duties being now discharged by the commissioners of supply.

MICHAELMAS DAY (*ante*), a day set apart according to the Roman Catholic church to offer thanks to God for the benefits received by the ministry of angels, and called Michaelmas in honor of St. Michael the archangel, whose power and vigilance saved the church from her enemies. The feast of St. Michael or Michaelmas was instituted, according to Brady, in 487, and Sep. 29 was fixed for the celebration, the day on which St. Michael's church on Mount Garganus was dedicated. There is a tradition that this feast was instituted by Alexander, bishop of Alexandria. There was a superstition in the 10th c. that on every Monday morning St. Michael held high mass in the churches. The Greek and other eastern churches, the church of England, and some other reformed churches, continue to observe the feast of St. Michael, in order, as Wheatly says in his book *On the Common Prayer*, "that the people may know what benefits Christians receive by the ministry of angels."

MICHAUD, JOSEPH FRANÇOIS, 1767–1839; b. in Savoy, educated in the ecclesiastical college of Bourg; at 19 employed in a book-store at Lyons; author, the following year, of *Voyage au Mont Blanc*, followed by other essays. In 1790 he had the good fortune to meet the comtess Fanny de Beauhaenais who persuaded him to go to Paris, where he became a hearty follower of Voltaire and Rousseau, espoused republicanism by the force of the current around him, but was at heart, and by his social liens remained, a conservative and royalist. After the fall of Robespierre he contributed to the *Quotidienne* articles so squarely favoring the restoration that it became necessary for him to leave Paris. He was arrested, condemned to death, escaped, and passed four years in Switzerland and south France, occupied in light literary work. Returned to Paris in 1799; in 1803 published the poem *Printemps d'un Proscrit*. In 1806, in partnership with a younger brother, a printer, he undertook the great work *Biographie Moderne* in which the public men who were actively engaged in the great revolution were painted with dark colors. Michaud was led into history by a request of Mme. Cotton to write an introduction to her *Mathilde*, which called for an examination of original documents on the crusades, in which he became so deeply interested that it resulted in a work entitled *Tableaux Historique des Trois Prémière Croisades*, in the form of a romance published in 1807. Michaud was made member of the French academy in 1812. After the return of Louis XVIII. he was a pronounced adherent of the old dynasty, and in the *Quotidienne*, which he then edited, advocated all the tyrannous reactions of the Bourbon government. His poems though numerous, and in their time popular with those who sympathized with his opinions, are not of a high order. His *L'Apotheose de Franklin*, 1792, is interesting to Americans. The *Dernier Règne de Buonaparte*, published in 1815, is a valuable contribution to the history of that time.

MICHAUX, ANDRÉ, 1746–1802; b. France; studied science under the botanist Jussien, and the astronomer Lemonnier. In 1779 he traveled in England, whence he brought into France some new plants and shrubs. The next year he traveled through Auvergne and the Pyrenees, and, on his return to Paris, introduced several new varieties of Spanish grain. In 1782 the count of Provence, afterwards Louis XVIII., sent him to Persia on a scientific mission. On his arrival he was robbed by the Arabs of all his effects except his books. Assisted by the British consul at Bassora he went on as far as Ispahan, where he cured the shah of a dangerous disease. After spending two years in Persia he brought back to France a fine collection of dried plants and seeds. In 1785 he traveled extensively in North America on a scientific mission at the expense of the government; but the French revolution compelled him to return for want of funds. He was shipwrecked on the voyage to France, and lost nearly all his specimens. On his arrival in Paris in 1796 the directory would give no adequate recompense for his losses. In 1800 he sailed for Madagascar, where he died. His most important publications are *Histoire des Chênes de l'Amérique Septentrionale*. 1801; and *Flora Boreali Americana*, 1803. It is said that much of the latter work is the production of prof. Louis Claude Richard

MICHAUX, FRANÇOIS ANDRÉ, 1770–1855; b. France; son of André. He came to the United States three times in the employ of the French government, and made explorations among the North American forests for the purpose of bringing into Europe new varieties of trees. His *Histoire des Arbres forestiers de l'Amérique Septentrionale* contains the results of his American explorations, and gives an account of the distribution and the scientific classification of the principal American timber-trees, and the nature and uses of their timber. He also wrote a work *On the Naturalization of Forest Trees in France; Journey to the West of the Alleghany Mountains;* and *A Notice of the Bermudas.*

MICHEL, FRANCISQUE XAVIER, b. in Lyons, 1809, and there educated. He went to Paris on the completion of his school studies, contributed articles to several journals, and soon became interested in the literature of the middle ages. In 1830 he was sent by Guizot to England to examine documents pertaining to the ancient history of France. In 1837 he was in Scotland on the same mission. In 1839 Michel was called to the professorship of foreign literature at Bordeaux. He is member of the académies of inscriptions of Paris, Turin, and Vienna; and of the society of antiquaries of France and London. Among his original works are: *Job, ou les Pastoureaux*, 1832; *Histoire des Croisades*, 1833; *Deux Armées du Règne de Henri II., roi d'Angleterre* 1841; *Histoire des Races Maudites de la France et de l'Espagne*, 1847, 2 vols., an unique contribution to history; *Les Ecossais en France, et les Français en Ecosse*, 1862, 2 vols.; etc.

MICHELET, JULES, a brilliant French historian, b. at Paris, Aug. 21, 1798. He studied with great success under Villemain and Leclerc, and at the age of 23 became a professor in the collége Rollin, where he taught history, philosophy, and the classics. In 1826 he published *Les Tableaux Synchroniques de l'Histoire Moderne*, and was named master of conferences (*Maître des Conférences*) at the *ecole normale*. After the revolution of 1830 he was chosen head of the historic section, intrusted with the care of the archives of the kingdom, assistant to Guizot at the Sorbonne, and tutor to the princess Clémentine, daughter of the French king, and published several valuable books, such as *Précis de l'Histoire Moderne* (1833, of which there have been more than 20 editions); *Précis de l'Histoire de France jusqu'à la Révolution Française* (the 7th edition of which appeared in 1842); *Mémoires de Luther* (1835); *Origines du Droit Français cherchées dans les Symboles et Formules du Droit Universel* (1837). In 1838 he succeeded Daunau in the collége de France, and comte Reinhard in the professorship of moral philosophy. He now plunged into controversy with all the vivacity and impetuosity of his nature. The Jesuits were the grand objects of his dislike; and eloquence, sarcasm, sentiment, and history were all brought to bear upon them with brilliant effect. Three books were the fruits of his polemic: *Des Jésuits*, in conjunction with Edgar Quinet (1843); *Du Prêtre, de la Femme, et de la Famille*, (1844); *Du Peuple* (1846). In 1847 appeared the first volume of his *Histoire de la Révolution;* and it was finished in 1853, in 6 vols. When the affair of 1848 broke out, acting more wisely than most of his learned *confrères*, he declined to take an active part in political struggles, and quietly pursued his literary avocations. He, however, lost his situation in the archives office after the *coup d'état*, by refusing to take the oath of allegiance to Louis Napoleon. Other works of his were *L'Oiseau* (1856); *L'Insecte* (1857); *L'Amour* (1858); and *La Femme* (1859); *La Mer* (1861); *La Sorcière* (1862); *La Bible de l'Humanité* (1864); and *Nos Fils* (1869), a plea for compulsory education. His masterpiece is his *Histoire de France*, continued in *Histoire de la Révolution Française*, and *Histoire du XIXme Siècle.* Michelet died in 1874.

MICHELET, KARL LUDWIG, b. Berlin, 1801; graduated at the university of Berlin, receiving the degree of PH.D. in 1824. The following year he was appointed professor of philology and philosophy in the French gymnasium, and continued to hold this position for twenty-five years. During a portion of this period he was also professor of philosophy in the university of Berlin. He published a large number of works on metaphysical subjects, including the following: *System der philosophischen Moral; Die Ethik des Aristoteles; Geschichte der letzten Systeme der Philosophie in Deutschland von Kant bis Hegel; Anthropologie und Psychologie;* etc. From 1860 he edited the Berlin *Gedanke*, representing the philosophical society of that city.

MICHELIS, FRIEDRICH, b. Germany, 1815; educated to the profession of theology; ordained a priest at Munster, his birthplace, and became a private tutor. In 1864 he received the appointment of professor of philosophy at the lyceum of Braunsberg. Two years later he was an opponent of the ecclesiastical policy of Bismarck in the Prussian chamber. Notwithstanding this fact, he also opposed the Jesuitical influence and the dogma of the infallibility of the pope; publishing several pamphlets in support of his views, and incurring the displeasure of Rome, and eventually excommunication. He wrote in opposition to the theories of Darwin, and his intention appears to have been to reconcile the teachings of modern science with the doctrines of the Roman Catholic church. His most important work is *Die Philosophe Platon's in ihrer innern Beziehung zur Geoffenbarten Wahrheit.* He has of late edited an anti-Jesuit publication called *Der Katholik.*

MICHIGAN, a lake in the United States, the second in size of the five great fresh-water lakes, and the only one lying wholly in the United States, having Michigan on the n. and e., and Wisconsin on the west. It is 320 m. long, 70 m. in mean breadth, and 1000

ft. in mean depth. It is 578 ft. above the level of the sea, and has been found by accurate observations to have a lunar tidal wave of 3 in. It is the outlet of numerous rivers, and is connected by a canal, and sometimes by flooded rivers, with the Mississippi, which is believed to have been its ancient outlet. Its principal harbors are those of Chicago, Milwaukee, and Grand Haven; and its bold and, at certain seasons, dangerous shores are guarded by 23 light-houses. It forms, with the lower lakes and the St. Lawrence, a natural outlet for one of the richest grain-growing regions in the world.

MICHIGAN, LAKE (*ante*), containing an area of about 22,400 sq.m., 2,000 sq.m. larger than lake Huron. Its banks are low and sandy, containing rocky sections of sandstone and limestone, but no high bluffs. Inland the sand hills rise to the height of 150 ft. Its waters are wearing away the Wisconsin shores and leaving land on the Michigan side. Its outlet is through the straits of Mackinaw into lake Huron at its n.e. extremity, near the old trading-post of Mackinaw. Racine, a city of Wisconsin at the mouth of the Root river, and Manitowoc, Wis., at the mouth of a river of its own name, are among the larger cities on its borders. The best harbors are in the bays, and are artificially formed. Its islands are in the n. portion; the largest, Beaver island, 50 m. long, and the Fox islands in the n.e. It has 2 large bays—Green bay, 100 m. long, and Grand Traverse bay, 30 m. long, and 3 of lesser dimensions, Little Traverse bay, Little bay of Noquet, and Big bay of Noquet. It has important fisheries; white-fish and large trout are taken and exported in large quantities, fresh and canned. The largest rivers which empty into it are the St. Joseph, the Muskegon, the Grand, emptying into the lake at Grand Haven; the Kalamazoo, 200 m. long, the Manistee, 50 m. long, all in Michigan; the Fox in Wisconsin, and the Menomonee in Wisconsin, emptying into Green bay.

MICHIGAN, one of the United States, lying in lat. 41° 40′ to 48° 20′ n., and long. 82° 25′ to 90° 34′ west. It is bounded on the n. by lake Superior and St. Mary's river; e. by lake Huron, river and lake St. Clair, Detroit river, and lake Erie; s. by the states of Ohio and Indiana; and w. by lakes Michigan and Wisconsin, and has an area of 56,243 sq.m., or 35,995,520 acres. It is divided into 77 counties. The capital is Lansing; the chief towns are Detroit, Grand Rapids, East Saginaw, Jackson, Bay City, Saginaw City, etc. Michigan is divided by lakes Michigan and Huron into two irregular peninsulas—the upper, a wild and rough region of mountains and forests, containing about one-third the area of the state, lies between the northern portions of lakes Michigan and Huron, and lake Superior; while the lower is nearly inclosed in a vast horse-shoe bend of lakes Michigan, Huron, Erie, and the connecting straits and rivers. In the upper peninsula are the Porcupine mountains, rising to a height of 2,000 ft. with sandy plains and forests. The southern is a level, rich, fertile country of prairies and oak-openings, watered by numerous rivers, as the Grand, Kalamazoo, Muskegon, Saginaw, etc. The lower peninsula is of limestone strata, with coal and gypsum; the upper, of azoic formations, with metamorphic slates, gneiss rocks, trap, and rich mines of copper and iron. The climate is mild in the southern, and cold and bleak in the northern regions. The southern portion produces wheat, maize, fruits, butter, cheese, and wool in great abundance. Vast quantities of pine lumber are exported from the northern half of the state. The principal manufactures are flour and woolens. The extensive coast and rivers afford great facilities to navigation, while several railways traverse the state. The government is similar to those of the other states, and the school system is based on that of Prussia, with abundant revenues from public lands. The university of Michigan at Ann Arbor has 44 professors, and a foundation of 1,000,000 acres of land. The only charge to students who are resident in Michigan is $10 admission, and $15 annual fee. Detroit was settled by the French in 1610, who also established a trading-port at Mackinaw at about the same period. The British took Detroit in 1812, but restored it at the end of the war. The state was admitted to the union in 1837. Pop. '40, 212,267; 50, 397,654; '70, 1,184,296.

MICHIGAN (*ante*) derives its name from two Chippewa words, *mitchi* and *sawgyegan*, meaning "lake country." The discoverers and first settlers of the territory were the French missionaries and fur-traders, some of whom visited the site of Detroit as early as 1610, while in 1641 some French Jesuits found their way to the falls of the St. Mary. The first actual settlement by Europeans within the limits of the state was the mission at Sault Ste. Marie, founded by father Marquette and others in 1668. Three years later fort Michilimackinac (now Mackinaw) was established. Detroit was founded in 1701 by an expedition under Antoine de la Mothe Candillac. The territory fell into the hands of the English with other French possessions in 1763. After this event the Indian chief Pontiac organized a conspiracy to exterminate the whites, when a bloody conflict ensued. The garrison at Mackinaw was butchered, and Detroit was subjected to a long siege. It was not until 1796, 13 years after the peace of 1783, that the United States took actual possession of this region, though it was included within the boundaries of the northwest territory, so-called, and amenable to the ordinance of 1787. Afterwards it formed for a time a part of the territory of Indiana. In 1805 it was erected into a separate territory, with substantially its present boundaries, gen. William Hull being appointed governor. During the war of 1812–15 the inhabitants were sorely harassed by the Indians and the British. Gen. Hull surrendered Detroit to the British under circumstances which led to his trial and condemnation to death by court-martial. The sentence was not executed, how-

ever, and facts afterwards came to light which partially, or it may be wholly, relieved him from blame. Mackinaw was also captured, and at Frenchtown, early in 1813, a number of American prisoners were massacred by the Indians. Shortly afterwards gen. Harrison succeeded in driving the British out of the territory, and in 1814 a truce was concluded with the Indians. In 1816–17 a considerable portion of the territory was surveyed, and in 1818 a large body of land was offered for sale. In 1819 the territory was authorized by act of congress to send a delegate to that body. At different times from 1819 to 1836 the Indians ceded large tracts of land to the territory, and at the last-named date all the lower and a part of the upper peninsula had been freed from Indian titles. Partly in 1818 and partly in 1834 the territory now forming the state of Wisconsin was annexed to Michigan; but in 1836 it was erected into a territory by itself, and Michigan was reduced substantially to its original boundaries. Previous to 1823 the legislative power was vested in the governor and judges, but in that year it was transferred to a council consisting of 9 persons selected from 18 chosen by the people of the territory. In 1825 the council was increased to 13 members chosen upon the same plan, but in 1827 the law was changed so as to provide for the election of the councilors by the popular vote. In 1831 gen. Cass was succeeded by George B. Porter as governor, and the latter, dying in 1834, was succeeded by Stevens T. Mason. In 1835 a state constitution was adopted by a convention called for the purpose. It claimed jurisdiction over a strip of land also claimed by Ohio. There was danger that the dispute would lead to bloodshed, but in 1836 congress agreed to admit Michigan to the union upon condition that she should surrender her claim to the disputed territory and accept in lieu thereof a larger area in the upper peninsula. The first convention called to consider this proposal rejected it, but it was accepted by a second in Dec., 1836, and in January following Michigan was admitted to the union as a state. In 1847 the seat of government was removed from Detroit to Lansing, the latter at that time being in a dense wilderness. It is now a flourishing town, and the state capitol is one of the largest and finest structures of the kind in the United States.

Michigan is comprised in two peninsulas of irregular shape, separated from each other by the strait of Mackinaw, connecting lake Michigan with lake Huron. The largest of these peninsulas embraces the whole territory lying between these two lakes, and at its s.e. corner touches lake Erie. From lake Erie to the southern end of lake Huron it is divided from Canada by the Detroit and St. Clair rivers, the latter flowing into the former through lake St. Clair. The great mass of the inhabitants of the state at the present time dwell on the southern half of this peninsula, the northern portion, together with the whole of the upper peninsula, being very sparsely inhabited.

The upper peninsula, containing a little more than one-third of the state's area, is rugged and broken, and in parts mountainous. The Porcupine range of mountains is the watershed between the streams flowing into lake Superior and those flowing into lake Michigan. This range at its highest point is 1400 ft. above lake Superior—2,000 ft. above the sea. The surface on each side of the mountains presents a rugged aspect, with some picturesque scenery and considerable variety of soil. At the eastern end the mountains at their highest points do not rise more than 400 ft. above lake Superior. There are numerous lakes and marshes, and great forests, where pine and other soft woods are the prevailing growths, though fine groves of sugar-maple are found in some places. In some portions of the peninsula the forests have been destroyed by fire, thus transforming the region into a desert. The n.w. extremity of the peninsula is celebrated for its extensive deposits of copper and iron. The sugar-maple is found here in great abundance and of the best quality, but the soft woods are scarce. The land is generally sterile. The northern peninsula is 318 m. in length from e. to w., and from 30 to 160 m. in width, and in 1874 contained 61,814 inhabitants.

The southern peninsula, or Michigan proper, is in almost every respect a contrast to the northern. The surface is generally level, though in the s. it is broken by low conical hills rising from 30 to 200 feet. The length of the peninsula from s. to n. is about 275 m., its width 259 miles. It is unequally divided by a low water-shed extending from s. to n., and rising at the highest point from 600 to 700 feet. The larger portion of the peninsula lies w. of this water-shed, which slopes gradually towards lake Michigan. The shores on both sides are in many places steep, curving picturesquely around numerous bays and inlets. On lake Michigan they are frequently broken by bluffs and sand-hills from 100 to 300 ft. high. The s. portion of the peninsula is very fertile, the n. portion less so.

The islands in the state are numerous. The principal of these are isle Royal and Grand isle in lake Superior; Sugar and Nebish islands in St. Mary's strait, and Drummond island at its mouth; Marquette, Mackinaw, and Bois Blanc islands near the n. end of lake Huron; and the Beaver, Fox, and Manitou groups in the n. end of lake Michigan. The principal rivers are the Cheboygan, Thunder Bay, Au Sable, and Saginaw, flowing into lake Huron; the Huron and Raisin, into lake Erie; the St. Joseph, Kalamazoo, Grand, Muskegon, Manistee, Grand Traverse, Manistique, and Escinaba, into lake Michigan; and the Ontonagon and Tequamenon, into lake Superior. Most of these rivers are small, though several are navigable for short distances. Many small ponds are scattered through the state.

There is a coal field of 12,000 sq.m. in extent in the s.e. part of the state, but the veins are so far below the surface that they cannot be worked to advantage. The supplies of

fuel for the iron-works on lake Superior are more cheaply obtained from Ohio. Limestone is abundant, and on the shores of lake Huron, in the n. part of the state, are formations which yield excellent grindstones. In the valley of Saginaw river salt is obtained by boring. The most productive copper region in the world, except that of Chili, is at the n.w. end of the upper peninsula. The veins sometimes bear silver in small quantities. The copper mines are mainly in the counties of Ontonagon, Houghton, and Keweenaw. The iron mines are principally in Marquette county. In the peninsula are remains of ancient mines and mining implements, which justify the presumption that at some distant period in the past the country was occupied by a race advanced in civilization.

Among the natural curiosities of the state are the "pictured rocks," so-called, on the shores of lake Superior, not far w. of Sault Ste. Marie. They are sandstone rocks worn by the water into picturesque shapes, resembling old castles, temples, arches, etc., which, viewed from a steamer's deck, are impressive and wonderful. In some instances the upper surface of these bluffs projects so far over the lake that steamers pass directly under them, and behind cascades which fall from the summits.

The climate of the lower peninsula is so tempered by the proximity of the lakes that it is much milder than that of other regions in the same latitude. The northern peninsula in winter is very cold. The average annual difference of temperature between the two peninsulas is 7°. Oak openings and prairies are the most characteristic feature of the lower peninsula. In the forests the prevailing growths are the sugar-maple, oak, walnut, ash, hickory, elm, linden, locust, dogwood, beech, sycamore, cherry, pine, hemlock, spruce, tamarack, cypress, cedar, and chestnut. In the n. portion of the peninsula the white pine is a source of wealth. The soils on the lower peninsula are well adapted to the production of fruit. Apples are produced in large quantities. Peaches grow well on the shores of lake Michigan, while grapes are extensively produced on the shores of lakes Michigan and Erie, and in the river valleys. Pears, quinces, plums, cherries, and the small fruits generally, are raised in perfection in the interior as well as on the borders of the lakes.

The extensive forests of northern Michigan are a covert for large numbers of wild animals, among which are the black bear, wolf, lynx, wildcat, panther, fox, weasel, marten, badger, skunk, mink, otter, raccoon, opossum, beaver, marmot, hare, rabbit, and squirrel. Deer are plenty in some parts, and the elk is not yet extinct. The birds are of great variety, and the waters of the state are well stocked with edible fish.

As an agricultural state Michigan ranks high. The number of farms in 1879 was 111,822, embracing 5,785,102 acres of improved and 4,530,486 of unimproved land—in all, 10,315,588 acres. Number of horses, 272,603; of milch cows, 291,243; of other cattle, 338,910; hogs, 493,109; sheep, 1,772,312; number of acres in apple orchards, 229,262; in peach orchards, 10,771. The latest crop statistics are those of 1878, from which the following items are gathered: Bushels of wheat raised, 29,511,889; corn, 36,663,299; oats, 13,454,517; clover-seed, 166,465; barley, 806,463; peas, 641,061; potatoes, 6,190,406; tons of hay, 1,124,931; lbs. of wool, 8,666,467; bush. of apples sold, 3,944,206; of peaches, 107,244; lbs. of grapes sold, 1,014,950; bush. of cherries, currants, plums, and berries, 100,493. The cash value of farms in 1870 was estimated at $398,240,578; of farming implements and machinery, $13,711,979; wages paid during the year, $8,421,161; value of farm productions, $81,508,623; of orchard products, $3,447,985; of produce of market gardens, $352,658; of forest products, $2,559,682; of home manufactures, $338,000; of animals slaughtered or sold for slaughter, $11,711,624; of live stock, $49,809,869. In 1873 there were sold, of dried fruits, 2,664,709 lbs.; of cider, 182,347 bbls.; of wine, 50,858 galls.; of 2-lb. cans of fruit, 1,003,803; of maple sugar, 4,319,793 lbs. The aggregate value of real estate assessed in 1875 was $308,753,036; of personal property, $66,127,992. These figures are supposed to represent but one-third of the real value of the property.

According to the census of 1870 there were in the state 9,455 manufacturing establishments, giving employment to 63,694 persons, of whom 2,941 were females above 15, and 2,406 were under that age. The capital invested was $71,712,283; wages paid, $21,205,355; value of products, $118,394,676. The principal industries, with the value of their products respectively in 1870, were, Agricultural implements, $1,569,596; blacksmithing, $1,581,357; boots and shoes, $2,552,931; carpentering and building, $3,976,333; carriages and wagons, $2,393,328; railroad cars, $1,488,742; clothing, $2,577,154; cooperage, $1,176,768; copper, milled and smelted, $9,260,976; flouring and grist mill products, $21,174,247; furniture, $1,953,888; iron products, $4,938,947; leather, $2,670,608; distilled and fermented liquors, $1,321,286; lumber, planed and sawed, $33,078,241; machinery, $2,330,564; printing and publishing, $1,071,523; salt, $1,176,811; sash, doors, and blinds, $1,868,596; tobacco and cigars, $2,572,523; woolen goods, $1,209,518. Other industries, the products of which ranged from $96,000 to $967,000 respectively, were masonry, brick and stone; tin, copper, and sheet-iron ware; wooden ware; ship-building; meat packed; paper; saddlery and harness. The lumber statistics of 1879 show: Number of mills, 64; men employed, 4,003; lumber cut, 2,289,066,855 ft.; shingles cut, 685,619,150. The salt product of 1879 was 2,058,040 bbls.; the wheat product, 10,290,200 bush.; product of iron mines, 1,453,765 tons, valued at $7,413,114. The total product of the copper mines in 1877 was 24,958 tons; total product from 1845 to 1877 inclusive

289,188 tons; ingot copper, 1877, 19,966 tons, valued at $7,586,480; total value of product from 1845 to 1877, $116,928,280; total assessments from 1845 to 1877 by working mines, $3,960,000; total dividends paid in same time, $21,780,000; dividends paid in 1877, $1,740,000. The catch of fish from the lakes in 1870 was valued at $567,576.

The value of foreign imports in 1874 was $2,353,786; of exports, $9,526,629; number of vessels which entered the ports of the state, 4,682—tonnage, 1,420,317; vessels cleared, 4,718—tonnage, 1,431,355. The foreign trade is almost entirely with Canada. The exports consist for the most part of grain, flour, hogs, lumber, beef, pork, tobacco, cotton, and railroad cars. The vessels registered in the state in 1874 were: sailing, 368, of 52,907 tons; steamers, 358, of 68,239 tons; vessels built: steamers, 34, of 8,834 tons, sailing, 42, of 15,383 tons.

The railroad statistics for 1878 were as follows: Miles of track, 3,564; capital stock paid in, $148,152,011; total debt, $161,373,748; cost of roads and equipment, $154,256,078. The railroad interests are represented by 41 distinct corporations, but the roads are actually managed by 27 companies. Of the 11,552 stockholders 4,550 reside in the state, holding $4,685,819 of the more than $147,000,000 of capital. But 5 of all the roads paid dividends in 1878, viz.: the Chicago and Northwestern; Detroit Lansing and Northern; Lake Shore and Michigan Southern; Michigan Central; and Mineral Range. There is a ship-canal about a mile long around the falls of the St. Mary's at Sault Ste. Marie, which is of great advantage in facilitating commerce between lakes Superior and Huron; and another, two miles long, connecting Portage lake with lake Superior on the w. side of Keweenaw point. The first of these canals was opened in 1855, the second in 1873.

In 1873 there were in Michigan 77 national banks, with a capital of $9,802,200; and a circulation of $7,139,217. In 1879 there were 14 state and 14 savings-banks. The capital of the former was $874,400; resources of the latter, $7,958,675. The number of insurance companies authorized to transact business in Michigan in 1878 was 195, of which 50 were incorporated under the laws of the state. One of these was a life insurance company, with assets amounting to over $900,000, and risks amounting to $11,641,000. Two stock fire companies had risks amounting to $22,000,000; 47 farmers' mutual fire companies, with 57,000 members, had at risk $107,000,000. From 1870 to 1877 the aggregate business of stock fire companies in the state was as follows: Risks, $1,210,261,365; premiums received, $17,071,744; losses, $9,817,689. During the same period these companies paid to the state in taxes about $500,000. The number of life insurance companies of other states doing business in Michigan in 1878 was 28. The whole number of policies on the lives of citizens of the state was about 22,000, representing insurance to the amount of $42,000,000.

Michigan takes a high rank in all matters pertaining to education. The school statistics for the year ending Sept. 1, 1879, were as follows: Number of school districts, 6,248; children of school age, 486,933; whole number attending school, 342,018; number of teachers, 18,616; total wages of teachers, $1,880,945; average monthly wages of male teachers, $38.69; of female teachers, $23.48. Amount of moneys from preceding year, $729,744; received from two-mill tax, $494,011; from primary school fund ($2,743,519), $229,384; from district taxes, $2,049,755; from all other sources, $340,893—total receipts for the year, $3,843,790. Expenditures: Male teachers, $712,594; female teachers, $1,160,865; for building and repairs, $864,135; bonded indebtedness, $329,466; all other purposes, $497,576. The state normal school, opened in 1853, has graduated nearly 1000 teachers. It is well organized and efficiently managed, having four courses of instruction—common school, full English, ancient languages, and modern languages. Few states of the union have made more ample provision for the higher education of youth than Michigan. High schools or academies, supported by state funds and taxes, are established in all the larger cities and towns; the state university at Ann Arbor, one of the foremost of American colleges in respect both of its endowments and courses of instruction, went into operation in 1842, and is open to students of both sexes on equal terms. The state agricultural college, near Lansing, affords instruction for those who wish to fit themselves for agricultural pursuits. Besides these there are six other colleges under the patronage of different religious denominations, nearly all of which are open to students of both sexes. There are for women several seminaries of a high grade. The professional schools equal the best elsewhere.

The bonded debt of the state in 1879 was $913,149; and at the same time there were on hand applicable to its payment funds amounting to $912,000. The total resources of the state, applicable to ordinary expenses, amounted in 1879 to $2,626,153; the expenses of the year were $2,019,885, leaving a balance of $606,267. The trust funds (mainly for educational purposes) for which the state is accountable amount to $3,419,145. The new capitol at Lansing, costing $1,390,000, the corner-stone of which was laid in 1873, was dedicated Jan. 1, 1879.

In 1873 there were in the state 253 newspapers and periodicals, of which 22 were dailies, 3 tri-weeklies, 209 weeklies, 2 semi-monthlies, 1 fortnightly, and 16 monthlies. According to the census of 1870 the whole number of libraries was 26,763, of which 23,761 were private; total number of volumes reported, 2,174,744, of which 1,196,113 were in the private libraries; 423 town and city libraries had 14,207 volumes; 246 school

and college libraries, 37,734 volumes; public school libraries,125,331 volumes; 1731 Sunday-school libraries, 239,471 volumes; 436 church libraries811,891 volumes; 116 circulating libraries, 53,704 volumes.

The principal charitable, reformatory, and penal institutions of the state are: the Michigan asylum for the insane at Kalamazoo, organized 1854; the eastern Michigan asylum, founded at Pontiac, 1873; the Michigan state retreat for the insane, near Detroit, under the care of the sisters of charity; the institution for the deaf and dumb, at Flint; the state asylum for the blind (now nearly completed); the state public school at Coldwater, designed to "provide for all the dependent children of the state, whether in or out of the county poor-houses, who are sound in body and mind, to maintain and educate them while temporarily in the school," and until homes can be provided for them; the state reform school at Lansing; the state house of correction at Ionia; the reform school for girls; the Detroit industrial school; the state prison at Jackson.

The population of Michigan has risen from 551 in 1800 to 1,636,331 in 1880. The inhabitants of foreign birth numbered in 1870 only 268,000. The number of males in 1874 was 697,184; of females, 636,847. The governor and other state officers are elected once in two years, the day of election being the Tuesday after the first Monday in November. The governor's veto can be set aside by a vote of two-thirds of both houses of the legislature. The legislative power is vested in a senate of 32 and a house of representatives not exceeding 100 members, elected for two years, and meeting every alternate year on the first Wednesday of January. The supreme court consists of a chief-justice and three associate justices, elected for 8 years, and eligible to re-election. The court has both appellate and original jurisdiction. There are 14 circuit courts, each presided over by one judge, elected for 6 years; they have original jurisdiction in all matters civil and criminal, and appellate jurisdiction from all inferior courts. The salaries of the supreme court judges are $4,000 per annum, those of the circuit court judges, $1800. A probate judge is elected in each county for 4 years; justices of the peace in every township for the same term. The church organizations in 1870 numbered 2,239; church edifices, 1415; church property, $9,133,816. The principal denominations are: Baptist, Freewill Baptist, Christian, Congregational, Episcopal, Evangelical Association, Friends, Disciples, Jews, Lutheran, Methodist, Presbyterian, Reformed Dutch, Reformed German, Roman Catholic, Second Advent, Spiritualist, United Brethren in Christ, Unitarian, and Universalist.

The electoral votes of Michigan for president and vice-president of the United States have been cast as follows: 1836, 3 for Van Buren and Johnson; 1840, 3 for Harrison and Tyler; 1844, 5 for Polk and Dallas; 1848, 5 for Cass and Butler; 1852, 6 for Pierce and King; 1856, 6 for Fremont and Dayton; 1860, 6 for Lincoln and Hamlin; 1864, 8 for Lincoln and Johnson; 1868, 8 for Grant and Colfax; 1872, 11 for Grant and Wilson; 1876, 11 for Hayes and Wheeler; 1880, 11 for Garfield and Arthur.

MICHIGAN CITY, a t. in Indiana, on the s. shore of lake Michigan and on the Michigan central railroad, at the junction of the Louisville, New Albany, and Chicago railroad with the Indianapolis, Peru, and Chicago; pop., '70, 3,985. It is delightfully situated at the mouth of Trail creek, about 38 m. from Chicago by water, 56 m. by rail, 13 m., n.w. of La Porte, and 140 m., n.w. of Indianapolis. It is the center of an important trade in salt and lumber, and the commerce of the lake, and as a shipping point for iron ore. It contains the northern state prison, has two newspapers, and a national bank. It has good schools and is the seat of Ames college. Its industries are the manufacture of lumber, wagons, boots and shoes, and furniture; and it has planing mills, foundries, locomotive works, and the railroad repair shops of the lines which center there.

MICHIGAN STATE AGRICULTURAL COLLEGE, at Lansing the capital of the state, is the oldest of all the institutions of the kind in the country. It was established in obedience to a direct provision of the constitution of the state, Feb. 12, 1855, and opened to students May 13, 1857. It is endowed by the sale of lands given by the general government to the state in 1862. Of the 235,673 acres so given, 86,121 acres have been sold, forming a fund of $275,104, on which the state pays 7 per cent interest to the college for its current expenses. The annual income of about $18,000 is supplemented by liberal appropriations on the part of the state. The property of the college, exclusive of the lands and endowment fund, is $275,000. The college buildings stand in a park of about 100 acres, being a part of its farm of 676 acres. The principal buildings are a college hall for chapel, library, general museum, and class rooms, two dormitories with the armory in one of them, a chemical laboratory, a botanical laboratory, a greenhouse with propagating houses attached, an apiary, 5 farm barns, piggery, carpenter's shop, 5 dwelling houses. It has farm gardens of various kinds, botanical grounds, an arboretum, orchards, stock, etc. Its collections in natural history and its apparatus are of considerable value. Its library contains about 5,000 bound volumes and 900 pamphlets. The college has but one course of study, four years in length, embracing, besides agriculture, horticulture, and the sciences connected therewith, the elements of a general education. It has 7 professors, and 6 other officers, 232 students; and 205 alumni. Women are admitted into the classes, and one woman has been graduated. Students are required to labor three hours each day, Saturdays and Sundays excepted, and for the most of this labor a small compensation is given. The state has on deposit arms and accouterments.

and a volunteer military company drills once (usually twice) a week. There is no preparatory department. President, T. C. Abbot.

MICHIGAN, UNIVERSITY OF, at Ann Arbor, Washtenaw co., Mich., was founded in 1837, though not opened until 1842. Its first endowment was the gift by congress in 1826 of two townships of land. It is supported by the state, and open to students of both sexes, without charge for tuition, on payment of a small matriculation fee and the annual payment of $15. It is a part of the public educational system of the state, the constitution providing for the perpetuation of the governing body of the institution, the board of regents. It aims to complete and crown the work which is begun in the public schools, by furnishing ample facilities for liberal education in literature, science and the arts, and for thorough professional study of medicine, law, and dentistry. While Michigan has endowed her university primarily for the higher education of her own sons and daughters, she also opens its doors to all students, wherever their homes. Students from other states are asked to pay a larger admission fee than students from Michigan, but in all other respects their advantages are the same. The university comprises the department of literature, science and the arts, the department of medicine and surgery, the department of law, the school of pharmacy, the homœopathic medical college, and the dental college. Each of these departments and colleges has its faculty of instruction, who are charged with the special management of it. The university senate is composed of all the faculties, and considers questions of common interest and importance to them all. Post-graduate courses are provided for the graduates of this university, or for the graduates of any college or university who may desire to pursue advanced study whether for a second degree or not. The school of pharmacy is a distinct school, having a regular course of two years. The libraries of the university accessible to the students, amount, in the aggregate, to about 36,000 volumes. The astronomical observatory contains the large meridian circle constructed by the famous makers, Pistor & Martins, of Berlin, one of the largest and best of the kind; a sidereal clock, made by Tiede, of Berlin; the collimators for the meridian circle; the library of the observatory, and the smaller instruments. One of these is a chronograph with Bond's new isodynamic escapement, for recording observations by the electro-magnetic method. In the dome is mounted a large refracting telescope, with an object glass 13 in. in diameter, constructed by the late Henry Fitz, of New York. A set of self-registering meteorological instruments has recently been added. It consists of Hough's barograph and thermograph, Robinson's anemometer with Gibbons's self-registering attachment and an anemograph. Means have been provided for the erection of a small observatory for the purpose of instruction, on the observatory grounds near the main building. A fire-proof museum building 127 by 47 ft., has just been erected. The collections in the museum embrace 6,000 mineralogical specimens; a geological cabinet, with 41,000 specimens; zoölogical cabinet with over 110,000 specimens; a botanical cabinet, containing 10,000 species, 20,000 entries, and 70,000 specimens; exhibitions in archæology and relics, embracing memorials of the native Indian tribes; collection in department of fine arts and history, embracing a gallery of casts of the most valuable ancient statues and busts, terra cotta models, gallery of engravings and photographic views executed in Italy and Greece, historical medallions, and copies of modern statues, busts and reliefs by the great masters. The anatomical museum is rich in valuable specimens. There are no dormitories and no commons connected with the university. The university (1880) is served by 36 professors, 9 assistant professors, and 16 lecturers and assistants. Number of students in 1880: department of literature, science and art, 448; department of medicine and surgery, 350; department of law, 395; school of pharmacy, 81; homœopathic medical college, 70; college of dental surgery, 83; total, 1427. President, James B. Angell, LL.D.

MICHILIMACK'INAC. See MACKINAW, *ante*.

MICHOACAN', or MECHO'ACAN, a political division, or state of Mexico, extending over the table-land of the same name, and the low country lying between it and the Pacific, and a portion of the hilly country s. of these districts; 21,609 sq.m.; pop. '68, 618,240. Its n.e. districts are watered by the river Santiago. The Sierra Madre and its branches traverse it in all directions; and within its territory are the lake of Patzcuaro, the peak of Tancitaro, and the volcano of Xorullo (Jorullo). The Cerro de Santa Rosa, in the district of Tlapujahua, about 17,000 ft. in height, is the highest point. The mountain ridges are divided by fertile valleys, drained by the Lerma, Mescala, and other rivers, and numerous mountain streams. The largest lakes are the Patzcuaro, already named, 30 m. in circumference; and Chapala, which is 60 m. long by 20 wide. The coast line is 100 m. in extent, the only ports being San Telmo, Maratua, and Buceria. The state is divided into 17 districts; the climate is very variable, the mean annual temperature in the capital being 71° F. The country has large mineral deposits, including gold, silver, copper, iron, coal, cinnabar, lead, sulphur, emery, lithographic stone, and copperas. The mines are but little worked, the annual yield being at present a little more than one million dollars, that of silver being one-third of the amount. In the districts along the n. boundary line carbonate of soda is collected. There are manufactures of importance, including sarapes (Mexican shawls), blankets, silver ware, flour, and glass. Cabinet and dye-woods are exported; also coffee, indigo, silk, gold, silver, and copper, chiefly to contiguous states and to Guatemala. Education is conducted in this state through a system

including a state college, 53 girls' schools, and 28 for boys. Capital, Morelia (formerly Valladolid).

MICIPSA. See JUGURTHA, *ante*.

MICKIEWICZ, ADAM, 1798–1855; b. Poland; son of a Lithuanian nobleman, who pursued unsuccessfully the profession of an advocate. Mickiewicz received his elementary education at the schools in Nowogrodek and Minsk, and in his eighteenth year entered the university of Wilna, where his uncle was a professor. This university, for whose regency the poet Campbell was at one time a candidate, was then the most important educational institution in Russian Poland. There Mickiewicz became acquainted with the Polish revolutionist, Thomas Zan, and joined one of the patriotic secret societies which Zan was forming at Wilna. He gave most of his time, while at the university, to chemistry and poetry; his first published poem was addressed to Lelewel, university professor of history, and an ardent Polish patriot. After leaving Wilna, he became professor of classical literature in the college at Kowno, and it was during his residence there that two volumes of his poems were published, in 1822. Like Byron, Mickiewicz "woke up to find himself famous." The poems in these two volumes, though of varying degrees of merit, at once gave their author a reputation superior to that of any native poet. Many of them are founded on old Lithuanian superstitions and folk-songs. Two longer poems are contained in this collection: one of them, *Grazzna*, tells how a Lithuanian princess, for her husband's honor, dies, in his armor, upon the field. The other, *Dziady*, or *The Ancestors*, is a sort of autobiographical drama of marked power. Dmochowski, the translator of Homer, attacked him for his romanticism; but a new school of rising poets gathered round him, and became known as the "School of Mickiewicz." His popularity with his countrymen was raised to an unbounded pitch by his imprisonment by the Russian authorities on account of his connection with the Polish secret societies. His friend Zan was sentenced to perpetual imprisonment; and Mickiewicz was condemned to perpetual banishment in Russia. He resided at first in St. Petersburg, where he made the acquaintance of Pushkin and other literary men. His intimacy with Pushkin excited the suspicions of the Russian government, which forced him to remove to Odessa. He traveled through the Crimea, and records his impressions in the *Crimean Sonnets*. These sonnets became very popular, perhaps as being the first written in Polish; but they are inferior to most of his other work. He lived for a time in the household of prince Galitzin, the governor of Moscow; but was soon allowed to remove to St. Petersburg. There, in 1828, he published *Conrad Wallenrod*, which, though having a distinct political animus, escaped the Russian censorship. It relates the story of a Lithuanian, who rose, in the 14th c., to the mastership of the order of Teutonic knights, enemies of Lithuania, solely to have a better opportunity to destroy them. The intention of the poem was clear to the Poles, but was lost upon the Russians. The work was translated into Russian, and the emperor Nicholas complimented its author. It is said that he was even offered a post in the Russian service, but he declined, and requested to be given permission to visit Italy for his health. His request was granted, through the good offices of the Russian poet Zhukovsky, and he started for Italy, by way of Germany, where he met Goethe. He took up his residence in Rome, where he became an intimate friend of James Fenimore Cooper. At Rome he heard of the Polish uprising of 1830, which the insurgents at Warsaw began by singing some parts of his *Ode to Youth*. He had gone as far as Posen, on his way to participate in the insurrection, when the news came that it was quelled. He went to Dresden, where he wrote a second part of *Dziady*, which appeared at Paris in 1832. This second part is likewise autobiographical, and gives an account of the poet's imprisonment at Wilna. He here represents himself in a scene which has been pronounced worthy of Goethe, as possessed by the devil, who is driven out from him by a priest. His last work of any length was a poem called *Pan Tadeusz*, or *Sir Thaddeus*, which appeared in 1834. It is entirely different in character and construction from the poet's other works. It deals with Lithuanian domestic life at the time of the approach of Napoleon's army in the campaign of 1812. Two years before the publication of *Pan Tadeusz* he wrote an absurd and eccentric work called *A Book of the Polish Nation and the Polish Pilgrimage*. In this book he attributes all the calamities which have fallen upon Poland to its toleration of Protestantism. Count Montalembert translated the book into French, on account of the warmth of its Roman Catholicism. He was married at Paris, in 1834, to a Polish lady named Celina Szymanowska, to whom some of his earlier verses are addressed. In 1839 he became professor of classical literature at Lausanne, and the next year he was called to the newly established chair of the Slavonic languages and literature in the college of France. His first lectures were successful; but he soon began to display a peculiar fanaticism. A Polish impostor, named Towianski, who had cured Mme. Mickiewicz by mesmerism in 1841 pretended to have revelations from the Virgin Mary, and these were interpreted by Mickiewicz. The latter finally ceased to allude to Slavonic literature at all in his lectures, but extolled Towianski as the new Messiah, and preached the worship of Napoleon Bonaparte. In 1844 the French government put a stop to the lectures, and ordered Towianski out of Paris. Mickiewicz's name, however, was not expunged from the list of professors. In 1848, after the February revolution, he went to Italy, in the vain hope of inducing the pope to do something in behalf of Poland. At the beginning of the

Crimean war he presented the cause of Poland to Louis Napoleon, who sent him on a mission to the east in 1855; and he died at Constantinople. The best edition of his works was published at Paris in 1844, edited, under his own supervision, by Alexander Chodzke. *The Polish Pilgrimage* was translated into English by Lach Szyrma, and the *Wallenrod* by Leon Jablonski. A poetical version of the latter work, by Cattley, appeared at London in 1840. Mickiewicz stands at the head of the literature of his own country, and his position in the general literature of Europe is high. No poet of this century, except Byron, to whom he has often been compared, has left more original poetical work of undoubted intellectual power and imagination; but the prose writings of Mickiewicz are, for the most part, extravagant and feeble.

MICKLE, WILLIAM JULIUS, 1734–88, b. Scotland; son of a Presbyterian clergyman, who had been assistant to Dr. Watts, and had been one of the translators of Bayle's *Dictionary*. After his father's death Mickle entered the business of his uncle, an Edinburgh brewer, who finally admitted him as a partner. He had, however, little business aptitude, and in 1755 he went up to London to get a commission in the navy. His efforts in this direction were unsuccessful, but he made the acquaintance in London of the first lord Lyttelton, who advised him to continue those poetical studies to which he had already given much of his time. He secured employment for a time as a corrector for the Clarendon press in Oxford. This was about 1765, and between that year and 1770 he published a number of minor pieces, one of which, an elegiac ode called *Pollio*, attracted considerable attention. *Concubine*, a poem in the Spenserian manner, appeared in 1767, and again, with many alterations and additions, as *Sir Martyr*, some ten years later. In his *Letter to Dr. Harwood*, and his *Voltaire in the Shades*, he attacked Arianism and deism; and about the same time he wrote a tragedy called *The Siege of Marseilles*, which was refused by all the managers, and was not represented. He had long projected an English version of the *Lusiad* of Camoëns; and his translation of the first book of that work appeared in 1771. He now left Oxford, though still maintaining himself by his work as a corrector there, and removed to the country, where he continued his translation of Camoëns, which was completed in 1775. This translation, though severely criticised in England on account of its diffuseness and inexactness, secured for Mickle the honor of an election to the royal academy of Portugal, during his residence in that country, where he had gone in 1779 as secretary to gov. Johnstone, and prize-agent. He published, while in Portugal, a poem called *Almada Hill*. On his return to England he wrote a number of pieces in verse and prose; the last of his productions was a ballad called *Eskdale Braes*.

MICMACS, the name of a tribe of Indians belonging to the Algonquin family, and inhabiting the maritime provinces of the Dominion of Canada—New Brunswick, Nova Scotia, Cape Breton, and Prince Edward island—and Newfoundland. They were found by the Cabots in their voyage in 1497, and some of them were taken to England as specimens of the North American Indian race. They preferred the sea-coast, and were expert hunters and fishermen. At the time of the French settlement of Canada there were believed to be between 3,000 and 4,000 Micmacs in the lower provinces; and missionaries worked among them with good results, particularly in gaining their permanent friendship for the French people. They fought and plundered the English persistently until 1760, after which date treaties were made with them, and reservations were set aside for them in New Brunswick. Efforts were made to direct their attention to agricultural pursuits, but these were unavailing. This tribe was peculiar in possessing a system of hieroglyphics of considerably more scope than existed among any other of the northern tribes. In 1873 there were 3,600 Micmacs, of whom 2,165 were in Nova Scotia and Cape Breton, 1,386 in New Brunswick, and 70 in Newfoundland.

MI'CROCOSM AND MACROCOSM. The belief, current in ancient times, that the world or cosmos was animated, or had a soul (see ANIMA MUNDI), led to the notion that the parts and members of organic beings must have their counterparts in the members of the cosmos. Thus, in a hymn ascribed to Orpheus, the sun and moon are looked upon as the eyes of the animating godhead, the earth and its mountains as his body, the ether as his intellect, the sky as his wings. The natural philosophers of the 16th c.—Paracelsus at their head—took up this notion anew in a somewhat modified shape, and considered the world as a human organism on the large scale, and man as a world, or cosmos, in miniature; hence they called man a *microcosm* (Gr. little world), and the universe itself the *macrocosm* (great world). With this was associated the belief that the vital movements of the microcosm exactly corresponded to those of the macrocosm, and represented them, as it were, in copy; and this led naturally to the further assumption that the movements of the stars must exercise an influence on the temperament and fortunes of men. See ASTROLOGY.

MICROCOS'MIC SALT is a tribasic phosphate of soda, oxide of ammonium, and water, which crystallizes with 8 equivalents of water, its formula being NaO,H_4NO,HO,PO_5+8Aq. It is prepared by mixing a hot solution of 6 parts of phosphate of soda with a concentrated solution of 1 part of muriate of ammonia, when the microcosmic salt crystallizes in large transparent prisms, while common salt remains in solution. On the application of heat it first loses its water of crystallization, and then its oxide of ammonium and basic water, so that only metaphosphate of soda remains, which, from its

ready fusibility into a colorless glass, is valuable as a flux in blow-pipe experiments. See BLOW-PIPE. This salt occurs in decomposed urine.

MICROM'ETER (Gr. *mikros*, little; *metron*, measure) is an instrument used for the measurement of minute distances and angles. Its different forms, depending on different principles, may be divided into two sections, according as they are applied to physics or astronomy. Of the former section are the vernier (q.v.) and the micrometer screw, the latter instrument being merely a screw with a very regular thread, and a large round head, which is carefully graduated, generally to sixtieths, and furnished with an index. It is easily seen that if a complete turn of the screw advance its point $\frac{1}{60}$th of an inch, a turn sufficient to pass the index from one graduation to another will only advance it $\frac{1}{3600}$th of an inch, etc. This is the micrometer used in the construction and graduation of instruments. Of those applied to astronomical purposes, the most simple is a short tube, across the opening of which are stretched two parallel threads, which are moved to or from each other by screws. These threads are crossed by a third perpendicularly, and the whole apparatus is placed in the focus of a lens. The distance of two stars is found by adjusting the two parallel threads, one to pass through the center of each star, taking care that the threads are placed perpendicular to the line joining the stars, and finding how many turns and parts of a turn of the screw are required to bring the wires to coincide. The angle of position of two stars is also obtained by turning round the instrument till the third wire, which is normally horizontal, bisects both stars; and reading off on the circumference the arc passed over. *Fraunhofer's suspended annular micrometer* consists merely of a steel ring surrounded by a flat rim of glass, and the position of the star is deduced from the time when it crosses the ring, and its path while within it. The abbé Rochon substituted for the wire micrometer one made of two prisms of rock-crystal or Iceland spar, capable of double refraction.

MICRONESIA AND MELANESIA, names of Greek origin, meaning respectively "small islands" and "black islands." The first is used by most geographers to describe the Ladrone and Caroline islands, Marshall's islands, the Kingsmill group, Radack and Ralick chains, the Gilbert group, and many others of small size. All of these are in the n.w. part of Polynesia and e. of India, being all n. of the equator and between 130° and 180° e. long. The most important of the groups are described under the proper titles. The inhabitants of the various groups speak a tongue which is not similar to those used in other parts of Polynesia, but nearer akin to that of the Malays, to whom many of the islanders bear a strong resemblance in color and features. Like most of the Polynesian groups, the islands are of coral or volcanic formation, scarcely rising above the level of the sea. Very little political or social connection exists between the different groups. The civilization and language of Micronesia were evidently derived in ancient times from contact with or descent from the Malays. The language is clear, flowing, and indicates that the inhabitants have at some time in the past been in a much higher state of civilization than when first visited by Europeans. Missionary stations have been established upon many of the islands and large numbers of the natives have been Christianized. On the other hand, the custom of ships, and especially whalers, of using the islands as a watering-station, has introduced drunkenness, debauchery, and disease to such an extent that the population is rapidly decreasing. The natives are distinguished from those of Australasia by their brown complexions and straight hair. In Melanesia, as the name implies, the inhabitants have the characteristics of the negro race. This name is given by some modern writers on geography to that part of Australasia lying s. of the equator and of Micronesia, and including Papua or New Guinea, New Ireland, Solomon's isles, the Louisiade group, New Hebrides, New Caledonia, and many small groups. The name is given altogether on the physiological grounds indicated, and is hardly well established as a geographical designation. See, for description, the articles under the names of the separate islands; also POLYNESIA, *ante*.

MI'CROPHONE. This instrument, invented in 1878 by prof. Hughes, does for faint sounds what the microscope (q.v.) does for matter too small for sight; the fall of a bit of tissue-paper or the tread of a fly being rendered audible at many miles distance. In principle the microphone illustrates the action of sonorous vibrations on the strength of an electric current. One of the most sensitive substances for microphonic action is willow-charcoal, plunged in a state of white heat into mercury. The theory is that in a homogeneous conductor the compressions and dilatations of the molecules balance each other, and no variation of current ensues, while under minute subdivision, with electrical continuity, sonorous waves affect the strength of an electric current, and variations in the current reproduce sonorous waves. One form of microphone consists of a piece of mercury-tempered carbon an inch long, placed vertically between two carbon-blocks hollowed to receive its ends, wires connecting the blocks with the battery and the receiver by which the sounds are to be heard. "A piece of willow-charcoal," says the inventor, "the size of a pin's head is sufficient to reproduce articulate speech." Two nails laid parallel, with wire connections, and a third nail laid across them, make a simple form of microphone. A few cells of any form of battery may be used. A continuous sound has been made by the mutual interaction of the microphone and telephone (q.v.), each instrument in turn repeating the sound made by the other. Many useful applications of the microphone have been made or suggested.

MI'CROSCOPE (Gr. *mikros*, small, and *skopeo*, I see) is an instrument for enabling us to examine objects which are so small as to be almost or quite undiscernible by the unaided eye. Its early history is obscure; but as it is quite evident the property of magnifying possessed by the lens must have been noticed as soon as it was made, we are quite safe in attributing its existence in its simplest form to a period considerably anterior to the time of Christ. It is generally believed that the first compound microscope was made by Zacharias Jansen, a Dutchman, in the year 1590, and was exhibited to James I. in London by his astronomer, Cornelius Drebbel, in 1619. It was then a very imperfect instrument, coloring and distorting all objects. For many years it was more a toy than a useful instrument, and it was not until the invention of the achromatic lens by Hall and Dollond, and its application to the microscope by Lister and others, that it reached the advanced position it now occupies among scientific instruments.

An object to be magnified requires simply that it be brought nearer to the eye than when first examined, but as the focal distance of the eye ranges from 6 in. to 14 in.—10 in. being the average focal distance—it follows that a limit to the magnifying power of the eye is attained whenever the object to be examined is brought so near. If, however, we blacken a card, and pierce a hole in it with a fine needle, and then examine a minute object, as, for instance the wing of an insect held about an inch from the card, we shall see it distinctly, and that too magnified about ten times its size. This is explained by the fact that the pin-hole limits the divergence of the pencil of rays, so that the eye can converge it sufficiently on the retina to produce a distinct impression, which is faint; and did not the blackened card exclude all other light, it would be lost. If we now remove the blackened card without either removing our eye or the object under examination, it will be found that the insect's wing is almost invisible, the unassisted eye being unable to see clearly an object so near as one inch; thus demonstrating the blackened card with the needle-hole in it to be as decided a magnifying instrument as any set of lenses.

By the apparent size of an object is understood the angle formed by two lines drawn from the center of the eye to the extremities of the object, which is larger when the object is nearer the eye than when further removed. This angle is called the angle of vision, and is quite distinct from the angle of the pencil of light, by which the object is seen. The focal length of a lens determines its magnifying power. The object to be examined is placed in its focus, so that the light which diverges from each point may, after refraction by the lens, proceed to the eye in lines as nearly parallel as is necessary for distinct vision. Thus, in fig. 1, AB is a double convex lens, in the focus of which we have drawn an arrow, EF, to represent the object under inspection. The cones drawn from its extremities are portions of the rays of light diverging from these points, and falling on the lens. These rays, if not interrupted in their course by the lens AB, would be too divergent to permit their being brought to a focus upon the retina by the lenses which constitute the eye.

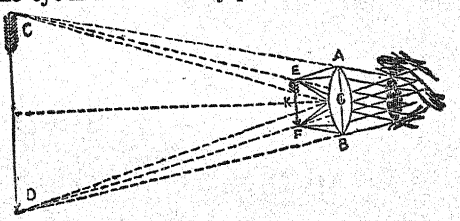
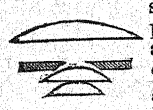


Fig. 1.

But as they are first passed through the lens AB, they are bent into nearly parallel lines, or into lines diverging from some points within the limits of distinct vision, as from CD. Thus bent, these rays are received by the eye as if proceeding from the larger arrow CD, which we may suppose to be 10 in. from the eye, and then the ratio of the length of the virtual image to that of the real arrow (nearly 10 to 1) gives the magnifying power of the lens in question. The ratio of CD to EF is the same as that of HG to KG. Now, HG is the distance of distinct vision, and KG the focal length of the lens, so that the magnifying power of a lens is obtained by dividing the distance of distinct vision (10 in. for most individuals) by its focal length. Thus, if the focal length of a lens be $\frac{1}{4}$ in., the magnifying power is $\frac{10}{\frac{1}{4}} = 40$. This supposes that the distance between the eye and the lens is so small as not materially to interfere with the correctness of this statement.

We have supposed the whole of the light to enter the eye through the lens AB (fig. 1), but we must now state that so large a pencil of light passing through a single lens would be so distorted by its spherical figure, and by the chromatic dispersion of the glass, as to produce a very indistinct and imperfect image. This is so far rectified by applying a stop to the lens, so as to allow only the central portion of the pencil to pass. But while such a limited pencil would represent correctly the form and color of the object, so small a pencil of light is unable to bear diffusion over the magnified picture, and is therefore incapable of displaying those organic markings on animals or plants which are often of so much importance in distinguishing one class of objects from another. Dr. Wollaston was the first to overcome this difficulty, which he achieved by constructing a doublet (fig. 2) which consists of two plano-convex lenses, having their focal lengths in the proportion of 1 to 3, and placed at a distance best ascertained by experiment. Their plane sides are placed towards the object, and the lens of shortest focal length next the


Fig. 2.

object. By this arrangement the distortion caused by the first lens is corrected by the second, and a well-defined and illuminated image is seen. Dr. Wollaston's doublet was further improved by Mr. Holland, who substituted two lenses for the first in Dr. Wollaston's doublet, and retained the stop between them and the third. This combination, though generally called a triplet, is virtually a doublet, inasmuch as the two lenses only accomplish what the anterior lens did in Dr. Wollaston's doublet, although with less precision. In this combination (fig. 3) of lenses, the errors are still further reduced by the close approximation of the lenses to the object, which causes the refractions to take place near the axis, and thus we have a still larger pencil of light transmitted, and have also a more distinct and vivid image presented to the eye.



Fig. 3.

Simple Microscope.—By this term we mean an instrument by means of which we view the object through the lens directly. These instruments may be divided into two classes—those simply used in the hand, and those provided with a stand or frame, so arranged as to be capable of being adjusted by means of a screw to its exact focal distance, and of being moved over different parts of the object. The single lenses used may be either a double convex or a plano-convex. When a higher power is wanted, a doublet, such as we have already described, may be employed, or a Coddington lens which consists (fig. 4) of a sphere in which a groove is cut and filled up with opaque matter. This is perhaps the most convenient hand lens, as it matters little, from its spherical form, in what position it is held. In the simple microscope, single or combined lenses may be employed, varying from ¼ to 2 inches. There are many different kinds of stands for simple microscopes made, but as they are principally used for dissection, the most important point next to good glasses is to secure a firm large stage for supporting the objects under examination. When low powers alone are used, the stage-movements may be dispensed with; but when the doublet or triplet is employed, some more delicate adjustment than that of the hand is necessary.

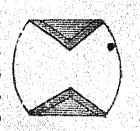


Fig. 4.

Compound Microscope.—In the compound microscope the observer does not view the object directly, but an inverted image or picture of the object is formed by one lens or set of lenses, and that image is seen through another lens. The compound microscope consists of two lenses, an object and an eye lens; but each of these may be compounded of several lenses playing the part of one, as in the simple microscope. The eye-lens is that placed next the eye, and the object-lens that next the object. The former is also called the ocular, and the latter the objective. The object-glass is generally made of two or three achromatic lenses, while the eye-piece generally consists of two plano-convex lenses, with their flat faces next the eye, and separated at half the sums of their focal lengths, with a diaphragm or stop between them. Lenses of high power are so small as to admit only a very small beam of light, and consequently what is gained in magnifying power is often worthless from deficient illumination. Various devices have been employed to overcome this difficulty. The light may be concentrated by achromatic condensers placed beneath the stage, or the curvature of the lens may be such as to allow as large a number of divergent rays as possible to impinge upon it. Such a lens is said to have a large "angle of aperture," the angle of aperture being that made by two lines converging from the margins of the lens to its focal point. Recently lenses, termed "immersion lenses," have been constructed, of such a curvature that when immersed in a drop of water placed over the object, light is admitted on all sides. With an immersion lens, there is high magnifying power with sufficient illumination.

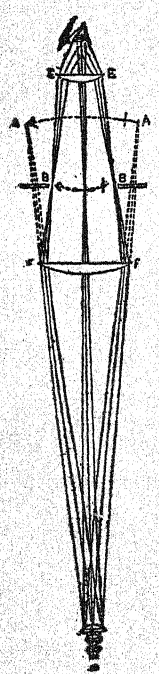


Fig. 5.

The following diagram (fig. 5) explains the manner in which the compound microscope acts. We have here represented the triple achromatic objective, consisting of three achromatic lenses combined in one tube, in connection with the eye-piece, which consists of the field-glass FF, and the eye-glass EE. Three rays of light are represented as proceeding from the center, and three from each end of the object. These rays would, if not interfered with, form an image at AA; but coming in contact with the field-glass FF, they are bent, and made to converge at BB, where the image is formed, at which place a stop or diaphragm is placed to intercept all light, except what is required to form a distinct image. From BB, the rays proceed to the eye-glass exactly as they do in the simple microscope, and as we have explained in fig. 1. The image therefore formed at BB is viewed as an original object by an observer through the eye-piece EE. The lens FF is not essential to a compound microscope; but as it is quite evident that the rays proceeding to AA would fall without the eye-lens EE, if it was removed, and only a part of the object would thus be brought under view, it is always made use of in the compound microscope.

A mirror is placed under the stage for reflecting the light through the object under

observation. This method of illumination by transmitted light is used when the object is transparent. When opaque, light is reflected on the object by a bull's-eye lens, called a condenser. The best instruments are supplied with six or seven object-glasses, varying in magnifying power from 20 to 2,500 diameters. The eye-pieces supplied are three in number, each of which consists of two plano-convex lenses, between which a stop or diaphragm is placed, half-way between the two lenses. As the magnifying power of a compound microscope depends on the product of the magnifying powers of the object-glass and the eye-piece, it follows that its power may be increased or diminished by a change in either or both of these glasses. In the mechanical arrangements, it is of importance to have the instrument so constructed, that while every facility is afforded for making observations and easy means of adjustment, there should also be great steadiness, without which, indeed, no satisfactory results will be obtained. These ends are achieved in various ways, of which Fig. 6 is one of the simplest: *a*, brass stand, supported on three feet; *b*, mirror, supported on trunnions; *c*, diaphragm, pierced with circular holes of various sizes, to regulate the admission to the object of reflected light from the mirror; *d*, stage-plate, on which the object is placed; *e*, screw, with milled head for fine adjustment; *f*, the object-glass, or objective; *g*, brass tube in which the body of the instrument is moved, so as to effect the coarse adjustment; *h*, the eye-piece, or ocular.

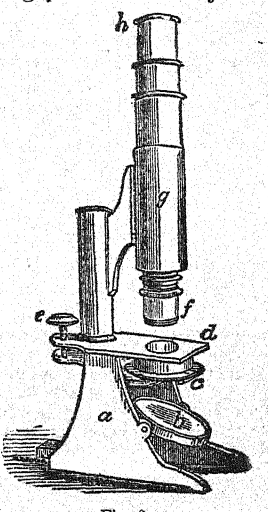


Fig. 6.

The microscope has now become so important an instrument in education, that almost every department of science in which it can be employed has a microscope suited to its particular kind of work, and a special treatise explaining and illustrating its use; and many branches of science have instruments peculiarly their own. Thus, chemists, anatomists, zoologists, etc., have each an instrument which they value as being peculiarly adapted for their special fields of inquiry and observation. From this instrument the chemist, and natural philosophers generally, have derived great assistance in studying the different kinds of crystals; for, by means of it, they can not only observe and recognize the great variety of forms that exist, but at any moment, and with little trouble, they may witness the process of crystallization, and leisurely study it. Those sciences in which it is most used, and for which it has done most, are anatomy, physiology, botany, zoology, medicine, mineralogy, and geology. In the practice of medicine all medical men who aim at a scientific treatment of disease have fully recognized how useful it has been as an agent in diagnosis, more especially in diseases of the kidneys. In the detection of crime and the vindication of innocence it is no less useful, as by means of it we can with certainty determine whether a suspicious stain, found, for instance, on the clothing of an individual charged with murder has been caused by blood or by another coloring-matter. In like manner we can determine whether hair found in similar circumstances belongs to a human being or not. It has also enabled us to distinguish the difference existing between substances that have a similar chemical reaction (e.g., the various kinds of starch, as flour, potato, sago, etc.), and thus we are provided with an agent quick in detecting adulteration.

A few hints to amateur observers may not be out of place here. In choosing an instrument, the simpler it is the better. The essential point to attend to is to have good glasses, which are tested by their power of showing some very minute markings, such as we find on diatoms. The circumference of the field of view should not be tinged with color, and the definition should be as good at the edge as at the center. The beginner should use low powers in preference to high ones. The best light is that reflected from a white cloud during the day. Artificial light should, if possible, be avoided. The table must be steady on which the microscope is placed, and when not in use the instrument should be covered by means of a glass shade. The observer also requires a few oblong glass slides, and a few circles of thin glass, called covering-glasses, to lay over the preparation under examination. For making sections, dissecting, and the various manipulatory operations attending the use of the microscope, he requires, moreover, a pair of forceps, a knife, or, perhaps better, a razor ground flat on the one side, a few needles fixed in handles, and two or three hair-pencils. So equipped, the observer is able to begin examinations of texture at once with pleasure and advantage. Begin with simple objects, such as pollen and thin slices of the cuticle of flowers, mosses, and different kinds of starch, such as *tous le mois*, buck yam, cycas, arrow-root, etc., and notice particularly their different characters. Make as thin a section as possible, place it on the center of the slide, and allow a drop of water to fall on it from the end of the handle of the needle. Then allow the covering-glass to fall gently on it—obliquely, so as to press out any small bubbles of air. He should also have a few bottles containing "reagents," such as dilute acetic acid (equal parts of pyroligneous acid and water) and liquor potassæ. By means of these reagents, peculiarities of structure may often be observed.

Microscopes vary much in price, from 5s. to upwards of £100. A good serviceable dissecting simple microscope may be had from any philosophical-instrument maker for from 9s. to 15s. Compound microscopes are more expensive, but a wonderfully good instrument for beginners can be had at 30s. It has one eye-glass and three object-glasses, and magnifies from 70 to 200 diameters. If a superior instrument is wished—one suited for most purposes of observation and research—any one of the following will be found well worth the price. The microscope of Hartnack, with a joint, so that it may be inclined at any angle, has two eye-pieces, two object-glasses, magnifies from 50 to 450 diameters, and costs about £7; Nachet's microscope has three eye-pieces, three object-glasses, magnifies from 50 to 750 diameters, and costs £10; Smith and Beck's educational microscope has two eye-pieces, two object-glasses, magnifies from 50 to 350 diameters, and costs £10; Ross supplies microscopes from £5 to £100, with various number of glasses.

For a more complete account of the different kinds of microscopes, and the various purposes to which they are applied, see Quekett *On the Microscope* (1855); Carpenter *On the Microscope* (1862); Hogg *On the Microscope* (1855); and *How to work with the Microscope* (1864), by Beale.

MICROSCOPIC ANIMALS. See ANIMALCULE, *ante*.

MICROTASIMETER, an instrument invented by Mr. Thomas A. Edison for the purpose of measuring very minute variations of pressure caused by the expansion or contraction of any given body, from whatever causes, heat, moisture, etc. A part of the apparatus is constructed upon the principle of the pyrometer, and when the expansion is caused by moisture, upon that of some forms of hygrometer. But the novel and unique part of the invention consists in the effect which the pressure of the expanding rod has upon the electric resistance of a piece of carbon placed in the circuit of a galvanic battery. A rod of vulcanite is used as the expanding element when it is desired to use the instrument to ascertain slight variations in the heat vibrations coming from any object, as the sun, or a gas, or electric light. This rod is adjusted in a strong frame kept at an equable temperature, so that no expansions or contractions shall exert any influence, except those which take place in the vulcanite rod itself. In the chamber which receives one end of this rod, or plate, there is placed under a follower, or slide, a piece of carbon, which becomes compressed with great force upon the expansion of the vulcanite rod. If radiant heat is to be measured, a large funnel is placed in front of the apparatus to gather the rays and throw them upon the rod or plate. When the rays increase in intensity the rod expands, compresses the button, and changes its conducting capacity, which at every moment is indicated by a galvanometer. The instrument has been used successfully to ascertain the variations in the radiation from the sun during an eclipse. It may also be used to note the variations taking place on a day when clouds are passing across the sun's disk, or when the transmission of his rays differs from increase or decrease of moisture. It may be used as a delicate hygrometer by substituting in place of the vulcanite rod a body containing gelatine, which expands under the influence of moisture.

MICROZA'MIA, a genus of plants of the natural order *cycadaceæ*. They are widely diffused over Australia. The fronds resemble those of palms, and are used in the Roman Catholic church on Palm Sunday. The underground stem is large and turnip-like, but covered with scales or leaf-scars, and contains a substance resembling tragacanth. The nuts of *M. spiralis* are edible, but are only used in times of scarcity.

MIDAS, a genus of platyrhine monkeys belonging to the family hapalidæ, which also contains the marmosets. The common name for the different species is *tamarin*. It has the following characters: Muzzle short, facial angle 60°; forehead with an appearance of prominence, arising from the great angle of the upper edge of the orbits; upper incisors contiguous, under incisors of the same size as upper; nails like claws, excepting those of the thumbs behind; tail the same as in the marmoset, or jacchus of Geoffroy, and dental formula the same, except that in the latter the incisors are more irregular. There are seven species, the typical one being *midas rosalia*, the marakina or silky tamarin. This very beautiful little monkey is of a golden yellow color, varying to a redder tint, rather paler on the back and thighs. The long and silky hair about the head and neck forms a kind of mane, on account of which it has sometimes been called the lion-monkey. Its beauty and gentleness render it a great pet; but it is delicate, and requires to be kept warm and dry. It is squirrel-like in its habits, a native of Guayana and the south of Brazil, from Rio Janeiro to cape Frio. There is a black and red variety, and one of a bright, shining red. The species should not be confounded with *M. leonina* of Humboldt, which is probably the smallest monkey known. It is brownish, and has a well-developed mane of that color which bristles up when the animal is angry so as to look like a little lion. It has a black face, a white mouth, and a tail black above and white below. It inhabits the plains bordering on the eastern slope of the Cordilleras, and is rare.

MI'DAS, a common name of the more ancient Phrygian kings, of whom Midas, the son of Gordius and Cybele, is the most famous. He was a pupil of Orpheus. Among the many legends regarding him is one that Bacchus granted his wish that whatever

he touched might become gold; from which so great inconvenience ensued, that he was glad to get himself relieved from the burden by washing, at the command of the god, in the Pactolus, the sands of which became thenceforth productive of gold. Another legend represents him as having offended Apollo by assigning the prize in a musical competition to Pan, and as having therefore been endowed by him with a pair of ass's ears, which he concealed under his Phrygian cap, but which were discovered by his servant.

MIDDELBURG, a t. of the Netherlands, capital of the province of Zeeland, in the island of Walcheren. It is connected with the sea by a canal, 5 m. long, which admits ships of heavy burden, and is a station of the railway from Flushing to Roosendaal to join the Dutch and Belgian lines. Pop. Jan. 1, 1875, 15,926. The city is nearly circular, and a league in circumference, surrounded by a broad canal. In former times Middelburg was one of the leading mercantile cities of the United Provinces, sending many ships to the East and West Indies, America, and all European ports, founding the colonies of Surinam, Berbice, Essequibo, Demerara, etc.; but the opening of the Scheldt for Antwerp, and other causes, have reduced the foreign trade to single ships to Java. Many of the inhabitants are wealthy, which, with its being the meeting-place of the provincial states of Zeeland, and possessing a considerable trade in grain, salt, etc.—making beer, vinegar, starch, leather, having snuff, chocolate, oil, and saw mills, and foundries—make it still a city of importance. It is the finest city of the northern provinces, having handsome houses, ornamented with gardens, and the canals and streets shaded with trees. The town-house, founded in 1468, has a beautiful tower, and is decorated with 25 colossal statues of counts and countesses of Holland. At the beginning of the 12th c. an abbey was founded, which was later enriched by Willem II., count of Holland and Zeeland. The buildings are now occupied as the meeting-place of the provincial states.

Middelburg does not date further back than the 9th century. In 1574 the Spaniards, under Mondragon, were compelled by famine to give up Middelburg, after having defended it for 22 months against prince Willem I. Though troops are stationed in Middelburg, it is no longer tenable against an enemy.

MIDDLE AGES, the designation applied to the great historic period between the times of classic antiquity and modern times. The beginning and close of this period are not very definite. It is usual, however, to regard the middle ages as beginning with the overthrow of the western Roman empire in the year 476; and there is a pretty general concurrence in fixing on the reformation as the great event which brought this period to a close. It began with the rise of the Frankish upon the ruins of the ancient Roman empire, and with the commencement of civilization among the barbarous tribes which had taken possession of the former Roman provinces. In course of it the different nations of modern Europe were formed, and their political and social systems developed. It was a period of much superstition, in connection with which much religious enthusiasm very extensively prevailed, manifested in many great religious endowments, in magnificent ecclesiastical buildings, in pilgrimages, and, above all, in the crusades. In the earlier parts of this period the church was much occupied in the extension of its bounds in the north of Europe, where heathenism still subsisted, and the means employed were not always consistent with the spirit of Christianity. During the middle ages the hierarchy acquired enormous power and wealth, and the papacy rose from comparatively small beginnings to its utmost greatness. During the middle ages chivalry had its rise and decline, modifying and in many respects tending to refine the feelings and usages of society. Towards the close of the middle ages the revival of letters, the increase of knowledge, and the formation of a wealthy and influential class in society, distinct alike from the aristocracy and the peasantry, tended, even before the reformation, both to the diminution of the power of the hierarchy and the decay of the feudal system. See Guizot's *Histoire de la Civilisation;* Rühs's *Handbuch der Geschichte des Mittelalters;* and Hallam's *History of the Middle Ages.*

MIDDLE AGES (*ante*), the period in history from the 5th to the 15th c., or between the fall of the Roman empire and the reformation. Its beginning witnessed the successful invasion of southern Europe by the barbarians of the north. The Vandals were masters of Africa; Spain was divided between the Suevi and the Visigoths, the latter occupying also a large portion of Gaul; Italy was in the hands of the Ostrogoths; while a tribe of Germans under Clovis had invaded and conquered France. The comparatively new Byzantine or eastern empire had already begun to decline, through the weakness and licentiousness of its rulers. Paganism had been overthrown, and Christianity was gradually penetrating into the unknown wilderness of northern and central Europe. What were known as the "dark ages," the first centuries of this period, had commenced the destruction of the old civilization which had been propagated from Phenicia, and had culminated in the ascendency of Greece and Rome. Western Europe, including even Italy, "lay prostrate at the feet of barbarian conquerors, and was a howling waste, in which the law of the strongest only prevailed."—The middle ages closed with the advent of Luther, Melanchthon, and Calvin, and the great battle for the freedom of the human conscience; with the discovery of America by Columbus; and with the invention of the art of printing by Guttenberg, Faust, and Schöffer, and

its application to the printing of the Bible at Mayence. In the beginning of this period the countries which we have named were swayed by incidental leaders and potentates, and given up a prey to a soldiery who lived by depredation and rapine. Protection for life or property there was none; and even the savage chieftains of that ignorant age soon perceived the necessity for some authoritative restraint. Out of this necessity grew the feudal system, in France, Germany, Aragon, a large part of Italy, England, and Scotland, probably occasioned in part by the gradual destruction of slavery, and in part to the fall of the Roman empire, for so long a time the seat of government of the world. It was natural that with Rome fallen, Europe should become divided among petty barons and princes, whose authority could only subsist so long as they were enabled to sustain it by force of arms. Under these circumstances, each leader fortified his possessions; and it was then that many of the castles and fortresses were erected, whose ruins are to-day the admiration of tourists in Europe. Every man who was capable of bearing arms was a soldier; and there was no such thing as a laboring class, since the hinds and villains who did the drudgery under the feudal system were held to be but little above the brutes whose care was one of their chief duties. Of this period it has been concisely said, "the peculiar general character of feudalism is the dismemberment of the people and of power into a number of petty nations and petty sovereigns; the absence of any central government." The foundation of this system consisted in the allotment of land in fee (Latin *feudum*), with the powers of bequest and inheritance, to the petty chieftains, who on their part agreed to give their services and those of their vassals, whenever called upon, either to repel invasion or to make incursions into the territory of others. Later, these barons, counts, and others, were permitted to take surnames, usually from the names of their castles or villages, and to adopt armorial bearings. This whole movement was a slow formation of the royal and noble elements of society as organized in future centuries.

With feudalism intervened another element of specific influence—the introduction of monasticism and the monastic orders throughout Europe; for the foundation of monasteries in Europe proves to have been a necessity to the progress of civilization. They served as a nucleus around which settlements were formed, the settlements growing into towns, the towns into cities. The prelates and abbots were feudal nobles, equally with the barons and counts. Their tenure of land was the same; and though they were not absolutely required to perform military service, there were many fighting men among them who did so, while none were exempt from furnishing their quota of armed vassals. And as the church grew strong in Rome, some reflection of her strength was felt wherever her servants were; until it was often the case that the lords and barons were made to experience a power in the hands of the abbots that they themselves did not possess. While the monastic system had undeniable and great evils, the teachings of the monks led generally toward a respectable, honest, and humane mode of life; and on such teachings the arts of peace and culture began to take root and flourish amid disorder and depredation, such as had not been known before since the foundation of Rome.

A new feature was after a time introduced into the feudal system by the occasional calling together of an assembly of the feudal lords by the sovereign—more, it is true, with the view of sustaining amicable relations with them than for any purpose of the division either of power or responsibility. At first these assemblies were merely festive gatherings; but after a time they assumed the form of advisory, and at last of deliberative meetings, when all legislative enactments were considered and debated. There were even in some of these gatherings traces of representative legislation; they were the first faint beginnings of the constitutional monarchy of a later age. The convocation of the French states-general, in 1302, was the first positive departure in this direction. The feudal system was now gradually discarded. The petty feuds of the early part of the middle ages became the great wars of their latter centuries, when the simple feudal compact could not supply such armies as were required. The tendency towards consolidation began now to be felt, just as that of displacement and separation had held sway after the fall of Rome. Kingdoms grew into enormous possessions and great wealth. Mercenary troops were employed in war, hired from monarchs or states not engaged in the conflict; and thus the idea of standing armies ready for emergencies grew into being. In fact, centralization of power began to be the law under which kings and emperors were conducting their policy, while representation was being made the lever with which the people were seeking to gain greater freedom of conscience and of person. This general condition spread through England and Scotland, France, Germany, Italy, and Spain. In Italy, Lombardy, and Venice arose republican governments; and the anomaly of great cities self-governed appears as one of the extraordinary features of the middle ages. Venice grew great in the arts and in commerce, and the marvelous promise of the period was broken only by intestine quarrels and the factious fights of the Guelphs and Ghibellines, and of other powerful Italian families, which, however, resulted in the destruction of the franchises of the people, and the foundation of petty principalities on the ruins of the liberty which had been achieved by the free cities. The history of Florence, Pisa, Genoa, and Venice, during a major part of the middle ages, is that of all Italy after the period when the northern portion of that country was under the control of the German emperors. Their commerce covered the Mediterranean, the Black sea, and the Adriatic, and extended into the far east by caravans. In the

darkest and most barbarous period, Venice conducted an extensive traffic both with the Greek and Saracen regions of the Levant. The crusades, which swept over Europe with an unexampled wave of enthusiasm, enriched and aggrandized Venice more perhaps than any other city. Her splendor, however, may be dated from the capture of Constantinople by the Latins in 1204, by an enterprise which, originally intended for the recovery of Jerusalem, was diverted to this more profitable adventure, in which not only the Venetian nations but the French were engaged. In the meantime wars assumed a scientific character, gunpowder was introduced into Europe, probably through the Saracens, and artillery began to be used in the early part of the 14th century. But incessant revolutions and family feuds tore the Italian republics to pieces, until Florence, the last of them, succumbed under the domination of Lorenzo de' Medici.

Charlemagne, king of the Franks and emperor of the Romans (768–814 A.D.), after his conquest of the Saxons and the Lombards, was invited into Spain to interpose in the wars of the Arabs and Moors in that country, and seized and added to his dominions all that territory lying between the Pyrenees and the Ebro. The Saracens conquered Spain in 711 A.D., and left behind them monuments whose ruins attest to this day the wonderful progress of oriental art under the caliphs, and give evidence of the spirit and enterprise which characterized the Arabs from the time of Mohammed to that of their expulsion from Spain (1492), when they had erected new empires in three-quarters of the globe.

The beginning of the 13th c. had seen an eruption of barbarians from Chinese Tartary, extending across all Asia and as far as the Euxine, which was not even paralleled by the invasion of Spain by the Saracens, or that of Italy by the savages of the north. Reducing the caliphate of Bagdad, they subverted the governments of Persia, Syria, and Iconium. To them it was owing that the Turks of the latter country, under Othman, penetrated through Asia Minor into Europe, from whence not all the western powers in six centuries have dislodged them.

The power of the church in the middle ages began in the conversion of Constantine, emperor of the west, who was baptized shortly before his death, 337 A.D. It was gained by slow steps, beginning with the accumulation of territory, and being extended by assumption of the authority to declare excommunication and interdict. By gaining vast wealth, and by playing upon the fears of weak princes, the bishops gradually encroached upon the rights and privileges of the highest potentates of Europe, until the pontifical authority of Rome controlled nearly every king and emperor from the Adriatic to the North sea. It was this influence that organized the crusades, and that occasioned half the wars that convulsed Europe during a period of ten centuries, yet without which, at this peculiar age of the world, civilization, the arts, letters, and commerce alike would have languished or remained unborn. The missionary enterprise of the church, after the discovery of America, populated the western continent, and opened an entire hemisphere to new empire and a new civilization. Devotion to the church prompted the genius of Raphael and Michael Angelo, and gave form to the wonderful conceptions which resulted in the spread of Gothic architecture, the most original, the most comprehensive, and the most symbolic that the world ever saw. It has already been shown how the ceaseless energy and enterprise of the church was the foundation of the advance from barbarism to civilization which characterized central and northern Europe between the 5th and the 12th century. At no other period in the world's history has there been such an awakening out of darkness and incapacity into light and power as that which followed the culmination of the strength of the church. Yet it was in the period immediately succeeding the reformation—the first and fiercest blow struck at the influence and prerogative of the church—that this awakening—*renaissance*—reached its height. When the middle ages closed, a Protestant queen was on the throne of England, then in the zenith of power and splendor. Calvin, Luther, and Melanchthon were defying the pope and making all Europe ring with tones deeper and further reaching than even those of the Vatican. The schools of art of Antwerp, Venice, Rome, and Siena had revived the genius of the Augustan age, and the newly-discovered power of the press was beginning that vast dispensation of intelligence which marks the modern period. Meanwhile, Cabot, Vespucius, and Vasco de Gama were sailing forth to discover new continents; Cortes and Pizarro were destroying the hitherto unknown Aztec civilization; and but a brief time elapsed before the pilgrim fathers planted the first seeds of freedom in America, leading in the new epoch of wars, conquest, legislation, disintegration, and rebuilding, which we call modern history.

MIDDLE BASE AND **MIDDLE CHIEF.** See POINTS OF ESCUTCHEON.

MIDDLE BASS ISLAND. See PUT-IN-BAY ISLANDS.

MIDDLEBOROUGH, a t. in s.e. Massachusetts, on the Namasket river, the junction of several lines of the Old Colony railroad—the Cape Cod branch, Boston to Provincetown, the Middleborough, Taunton and Providence, and the Old Colony and Newport. It is one of the most ancient towns in Plymouth co., and a summer resort of great attractiveness, on account of the picturesque beauty of its scenery and numerous features of historic interest within the town limits. Previous to the incorporation of the town of Lakeville, which was taken from its territory, it was the largest town in the state, and now numbers more than 60 sq.m.; pop. '80, 5,237. It lies on both sides

of the river, which runs in a winding course from large lakes (in the adjoining town) 5 m. away, with three falls furnishing valuable water-power, emptying into Taunton river. Game and fish abound in the lakes and their vicinity, and a small excursion steamer plies between the pic-nic grounds on the lakes to a pier at the upper falls. It comprises the thriving villages (all with churches, post-offices, and manufactures) of North Middleborough (Titicut), South Middleborough, The Rock, East Middleborough (Eddyville), a number of smaller villages and neighborhoods, and Middleborough Four Corners, the central portion, which is designated as Middleborough. It has several public halls, an elegant town house containing a commodious hall, a room for the district court, the public library, and a bank, besides the town offices, erected at a cost of $50,000, standing on an eminence commanding a view of many points of interest, among them Muttock Hill cemetery, about a mile from the Corners, a beautiful spot, where rest some of the founders of the old colony. In this vicinity is Oliver's walks, the site of the mansion of judge Oliver, who in the revolution espoused the tory cause and went to England. It was the seat of Peirce academy (Baptist), founded 1808, with a classical department, a valuable cabinet, and an average attendance of 300 pupils, including many from the southern states. During the rebellion its popularity diminished, and it has since been discontinued. The town has excellent public schools, is lighted by gas, and is laid out regularly, with numerous maples, elms, and other ornamental trees shading the streets and highways, which are celebrated for their beautiful drives. It contains the Bay State straw-works, employing a large number of girls in its extensive factories and at their homes in the adjoining towns and villages, 5 shoe-factories, 3 churches, 2 newspapers (1 monthly), 2 printing-offices, a hotel, the Star mills (woolen), and manufactories of lumber, shovels, needles, trunks, boxes, varnish, marble-works, and a variety of stores. It is a center of an important trade in horses, which are brought from Vermont and Canada. It is 12 m. from Plymouth, 10 m. from Taunton, 20 m. from New Bedford, 20 m. from Fall River, and 34 m. from Boston.

MIDDLEBURY, a t. in central Vermont, delightfully situated on Otter creek, a small stream flowing n.w. and emptying into lake Champlain; in a mountainous region, presenting very attractive scenery; pop. '80, 2,993. The Central Vermont railroad passes through it. It is 33 m. n.w. of Rutland, 35 m. s. of Burlington, and 33 m. s.w. of Montpelier. It has valuable water-power. It is the seat of Middlebury college, and has excellent public schools and a public library. It contains a national bank, 2 newspapers, 6 churches, 3 hotels, and a well-organized fire department. It has six quarries, where marble of various colors is quarried and exported, and it has iron-foundries and flour-mills; other industries are the manufacture of sashes, doors and blinds, cotton, wool, paper, and leather.

MIDDLEBURY COLLEGE, in Middlebury, Vt., opened in 1800, under Congregational control, has three buildings valued at $100,000, an interest-bearing endowment of $180,000, and an income of $13,000 annually. There are 11 instructors, and a library of 12,000 volumes. President (1881), Rev. Cyrus Hamlin, D.D., formerly a well-known missionary in Turkey.

MIDDLE C, in music, receives its name from its position on the general scale. It is the note which is a fifth above the F or bass clef, and a fifth below the G or treble clef. The C clef always represents the note termed middle C, and the lines and spaces above or below are designated accordingly.

MIDDLE LATITUDE SAILING. See SAILINGS.

MIDDLE LEVEL. Under the heading BEDFORD LEVEL, a remarkable district, covering 400,000 acres, is described, bounding the Wash on all sides except seaward, extending landward nearly to Brandon, Cambridge, Peterborough, and Bolingbroke, and embracing portions of the six counties of Northampton, Huntingdon, Cambridge, Lincoln, Norfolk, and Suffolk. It nearly coincides in area with what is popularly known as the Fens. The whole region was, centuries ago, converted into an unprofitable marsh by repeated incursions of the sea, coupled with obstructions to the outward flow of the rivers Nene, Cam, Ouse, Welland, etc. Vast operations have been carried on ever since the time of Charles I., by digging new channels and outfalls, and employing windmills and steam-engines to pump the water from the marshes and ponds into these artificial channels. The Bedford level is divided into the *North*, the *Middle*, and the *South levels*, managed by commissioners, whose powers are derived from special acts of parliament. The improved value of the land is the fund out of which the expense of the engineering works is defrayed. It was in one of these districts (the Middle level, between the Nene and the Old Bedford river) that an irruption took place in 1862, which strikingly illustrates the dependence of the safety of the whole region on well-formed and well-maintained embankments. There was a sluice, called St. Germain's sluice, situated at the confluence of the Middle level main outfall drain with the river Ouse, near the upper end of another artificial channel, known as the Eau Brink cut. The drain was made in 1847, and was enlarged ten years afterwards to a bottom-width of 48 ft., a side-slope of 2 to 1, and a level of 7 ft. below low-water spring-tide in the river; the rise of high-water spring-tide at that point was 19 ft., and the sill of the sluice was 6 ft. below low-water spring-tide.

On May 4, 1862, this sluice gave way without the slightest warning; the tidal waters undermined the brickwork, and formed a hole in the bed of the river, into which the works of the sluice sank. The tidal waters rushed up the opening, and ebbed and flowed throughout a distance of 20 miles. The commissioners of the Middle level applied to Mr. Hawkshaw, the engineer, to devise means for repairing the disaster. An earth and cradle-dam was attempted to be thrown across the drain, at about 500 yards from the fallen sluice; but this was relinquished in favor of a permanent coffer-dam of pile-work, at a distance of half a mile from the sluice; and after incessant exertions from May 16 to June 19, the tidal waters were at length effectually shut out by a strong dam. The failure of the St. Germain's sluice was not the only irruption that had to be battled with; eight days after that failure, under the pressure of a high spring-tide, the west bank of the drain gave way, on May 12, at a point about 4 miles from the sluice; the bank had been built only to resist upland waters, and not a rush and a pressure of the sea. The rupture carried away 70 yards of the bank, scouring out a hole 10 feet deep at the spot, and admitting a rush of water which covered 6,000 acres of fertile land to a depth of 2 or 3 feet, increased at successive high-tides to 10,000 acres.

When the finishing of the dam had enabled Mr. Hawkshaw to shut out the tidal waters, means had to be devised for getting rid of the flooding waters, and providing an outlet for the usual rivers and land-drainage of the Middle level. It was resolved to utilize some of the old outlets at other spots, and to supplement their action by enormous siphons, placed over the coffer-dam. Sixteen siphons were provided. They were made of cast iron, 3 feet 6 in. internal diameter, and somewhat over 1 in. thick; they rested on the top of the dam, and on inclined framework supported by piles at the sides. The valves were so arranged, that the siphons could be put in operation, either by exhausting the air or by filling them with water. When only six of the siphons were in position, they carried 50,000 gallons of water per minute over the dam.—For more minute details of the dam and the siphons, see Mr. Hawkshaw's paper read before the institute of civil engineers in 1863.

There are large items both of cost and of compensation in works of this kind. Nearly the whole of the Middle level is 15 feet below high-water spring-tides; it is difficult to keep out the sea-water, and at the same time to preserve an outlet for the land-water, especially Whittlesea mere; there are 130,000 acres to be drained somehow or other; but as the land is rich for farming, the commissioners, in past years, did not hesitate to spend £400,000 on 11 miles of drain, and £30,000 on the sluice. The drain runs through a district called *Marshland*, between Linn and Wisbeach; and as the bursting of the bank caused this district to be deluged with water, the commissioners have had to compensate the Marshland farmers and others; the amount of this compensation was frequently litigated between 1862 and 1867. As concerns the land itself, it is found to be more fertile after such inundations than before, owing to the amount of silt deposited on the fields. After repairing the breach in the bank, the 10,000 inundated acres were drained without much difficulty, through the Marshland, Smeeth, and Fen drain, and the Marshland sewer; the siphons are permanent channels, to carry off the usual land-waters regularly. The siphons were subjected to a severe trial in Jan., 1867, by the ice which accumulated around their lower ends; but iron gratings effectually resisted the entrance of the ice into the siphons.

MIDDLE PARK, one of the numerous fertile valleys which extend over broad distances in Colorado, being inclosed by spurs of the Rocky mountains, and remarkable for the variety and picturesque character of their scenery. It is in Summit co., about 3,000 square miles in extent, being 65 m. in length by 45 in width, and is 7,500 ft. above the level of the sea. It lies directly s. of North park, from which it is separated by one of the cross ranges of the great mountain chain. On its eastern side the Snow-range or continental divide sweeps around it, and it is completely surrounded by lofty mountains, among which Long's peak, Gray's peak, and Mt. Lincoln, from 13,000 to 14,000 ft. high, stand prominent. The head-waters of Grand river and the Blue river water this territory, both flowing westward to the Colorado. A portion of the park is heavily wooded, but much of it presents an expanse of grass-grown meadows, dotted with wild-flowers. Wild game is plentiful, and includes bears, elk, mountain-sheep, deer, and antelopes, and the waters are filled with fish. The climate is genial and the temperature equable. The most important feature of the park for tourists is the hot sulphur springs, 45 m. from Georgetown and 60 m. from Central City. These springs are found near a branch of the Grand river, about 12 m. from the southern termination of the park. Their waters are said to exercise a curative influence in cases of cutaneous disease, rheumatism, and neuralgia. About these springs a settlement for the accommodation of invalids is rapidly spreading into a considerable town. Grand lake, a handsome sheet of water, offering excellent trout and other fishing, is 27 m. from the Hot Springs, and is a point much frequented by excursion parties of tourists and convalescents.

MIDDLESBROUGH, the center of the n. of England iron manufacture, is an important market t., port, and parliamentary borough in the North Riding of Yorkshire, at the mouth of the Tees, 48 m. n.e. from York, returning one member to parliament. The town is of recent growth, and owes its origin as a port to its convenient position for the

shipment of coals brought down by railway from the mines in South Durham. In 1842 a commodious dock was constructed, which has recently been very considerably enlarged, and will admit ships of the largest tonnage.

On the discovery, in 1840, of immense beds of ironstone, extending throughout the whole range of the Cleveland hills, a portion of which lies close to the town, the smelting of iron was speedily embarked in on an extensive scale, which has since increased to a marvelous extent, to which has been added iron-foundries, the manufacture of rails, locomotive engines, tubes, boilers, etc.; chemical works, potteries, and ship-building are also carried on to a large extent. The town of Middlesbrough was incorporated in 1853, and constituted a parliamentary borough in 1868, is well built, and some of the streets present handsome specimens of architecture. The royal exchange, built in 1867, is a large and handsome building; within its spacious interior the weekly iron-market is held on Tuesdays, and is attended by parties connected with the iron trade from all parts of the kingdom, as well as foreigners. There are five churches of the national establishment, and numerous places of worship connected with the various religious denominations. Albert park, containing 72 acres, is tastefully laid out.

At the census taken in 1831 Middlesbrough was an obscure hamlet with 383 inhabitants; in 1871 the parliamentary borough contained a pop. of 46,643, and in 1874 it was estimated at upwards of 60,000.

MIDDLESEX, a co. in s. Connecticut, intersected from n. to s.e. by the navigable Connecticut river, emptying into Long Island sound, which forms its s. boundary; 400 sq.m.; pop. '80, 35,587—29,611 of American birth, 387 colored. It is drained by the Hammonassett river in the s., and the Salmon river, a branch of the Connecticut, both furnishing water power. It is intersected by the Connecticut Valley railroad, the Shore Line (N. Y., N. H. and Hartford), and the Boston and New York Air Line. Its surface is hilly and well wooded, and celebrated for the beauty of its scenery, the picturesque bluffs and terraced banks of the river. Its soil is not in general very fertile, except in the celebrated Connecticut valley: yet, well fertilized, it produces grain, garden produce, tobacco, a variety of orchard products, and those of the New England states in general. Among its variety of manufactures are Victor sewing-machines, brittania ware, tape, webbing, pumps, sleigh and hand bells, augurs and gimlets, ivory and bone goods, emery wheels, and engine-governors, etc. Granite, cobalt, and freestone are found, and valuable quarries of the celebrated Portland sandstone, which is largely exported for building-material. Capitals, Middletown and Haddam.

MIDDLESEX, a co. in e. Massachusetts, having the state line of New Hampshire for its n. boundary, drained by the Merrimac and Nashua rivers in the n., and the Charles, Concord, Sudbury, and Assabet rivers in other sections; 800 sq.m.; pop. '80, 317,951—234,665 of whom are of American birth, and 2,675 colored. It is intersected by a net-work of railroads; the Boston and Albany, branches of the Boston, Lowell and Nashua, the Boston, Clinton, Fitchburg and New Bedford, and the Boston and Maine. Its surface is hilly, and groves of oak, white ash, beech, elm, hickory, and other trees grow on the hills along the river banks, which are celebrated for their quiet beauty. Its soil is very fertile, producing large crops of corn, potatoes, and other garden and orchard produce. Horses, cattle, sheep, and swine are raised. The immense water power furnishes facilities for extensive manufactures, which command the attention of the inhabitants, somewhat to the exclusion of agriculture. They consist of a large variety, among them cotton and woolen goods, straw goods, boots and shoes, leather, carpets, and watches (at Waltham). The value of the manufacture of boots and shoes for one year is estimated at over $16,000,000, and of cotton goods at over $12,000,000; the reported annual value of all manufactures for one year is $113,147,270. The county includes the cities of Lowell and Cambridge (the seat of Harvard university), and the towns of Medford (the seat of Tufts college), Lexington, and Concord (the home of Emerson, and the seat of the Concord school of philosophy). Capitals, Lowell and Cambridge.

MIDDLESEX, a co. in e. New Jersey, having Staten Island sound and Raritan bay for part of its e. boundary, drained by the Raritan river, navigable to its county seat, flowing through it and forming its n.w. border, and emptying into the bay of the same name; also the South and Millstone rivers; 340 sq.m.; pop. '80, 52,286—42,162 of American birth, 1628 colored. Its surface in the n. portion is hilly, but in the s. is generally level. It is a fine agricultural region, the soil being in some portions light and sandy, and in all parts fertile. Its products include corn, wheat, and dairy products, and fruit in abundance. Cattle, sheep, and swine are raised. Sandstone is found, fire-clay or kaolin, and molding-sand. It is intersected by the railroad of the united companies of New Jersey, the Lehigh Valley railroad, and the New York division of the Pennsylvania railroad. The Millstone and New Brunswick railroad and the Delaware and Raritan canal terminate at its county seat, and a portion of it is traversed by the Freehold and Jamesburg agricultural railroad. It has extensive manufactures of India-rubber goods, carpets, hosiery, cork, paper-hangings, metal screws, white-ware, drain pipes, freight and passenger cars, harness, shoes, etc. Across the sound, 1 m. in width, is Staten Island 13 m. long, 5 m. s.w. of the city of New York. The harbors of the county are easily accessible to vessels, and have 4 ship-yards. A large number of steamboats and steam ferry-boats ply between its ports and neighboring cities. Seat of justice, New Brunswick.

MIDDLESEX, a co. in e. Virginia, having the Chesapeake bay for its s.e. boundary, the Rappahannock river for its n., and the Piankatauk river for its s. border; 150 sq.m.; pop. '80, 6,252—6,242 of American birth, 3,634 colored. Its surface consists mostly of level plains with low marshes in some sections. Its soil is a sandy loam, producing wheat, oats, corn, and dairy products. Cattle, sheep, and swine are raised, and oysters are abundant. Seat of justice, Saluda.

MIDDLESEX, a co. in s.w. Ontario, drained by the Thames river, forming part of its s.w. boundary; about 1228 sq.m.; pop. '71, 82,595. It is intersected by the Great Western railway, the branch railroad to Sarnia, the London and Port Stanley railway, the Grand Trunk, and a branch from St. Mary's. It is a fine agricultural region, and has white sulphur springs in the e. portion. It has 3 ridings. It is also supplied with water power by the Aux Sables and Sydenham rivers; and has extensive iron-foundries, machine shops, chemical works, breweries, and manufactories of boots and shoes, soap, candles, musical instruments, carriages, cabinet-making establishments, and has a large trade in grain and country produce. Seat of justice, London.

MIDDLESEX, the metropolitan co. of England, in the s.e. of the country, bounded on the n. by Hertford, and on the s. by Surrey, and about 60 m. inland (westward) from the North sea, with which it communicates by the river Thames. Next to Rutland, it is the smallest of the English counties, its area being only 180,136 statute acres; but its population is inferior only to that of Lancashire, and was, in 1871, 2,539,756. The surface is on the whole level, with gentle undulations. The Thames, which forms its southern boundary, and its affluents, are the only rivers of the county. Two of these, the Colne and the Lea, form respectively the western and the eastern boundaries of the county. The surface is also traversed by the Grand Junction and Regent's canal, and the New river, an artificial cut intended to supply the capital with water. The soil is in general poor, with the exception of a tract along the banks of the Thames, which consists of a good fertile loam. The county is chiefly occupied in grass and hay farms, and in market-gardens, the produce of which is sent to supply the metropolis. Parliamentary elections of members for Middlesex are held at Brentford, which is the county town. There are no other towns of importance except London.

MIDDLE TEMPLE, one of the four English inns of court, having the exclusive privilege of calling persons to the bar. See INNS OF COURT.

MIDDLE THIBET. See LADAKH, *ante.*

MIDDLETON, a small manufacturing t. of Lancashire, 6 m. n.n.e. of Manchester. Pop. '61, 9,876; '71, 14,587. It is chiefly dependent upon its manufactures of cotton cloth and silks.

MIDDLETON, a small decaying market t of Ireland, in the county of Cork, and 13 m. by railway e. of the city of that name. It contains a college, founded in 1696, noticeable as the place in which John Philpot Curran was educated, and still of considerable reputation, and carries on a general trade. Pop. '71, 3,603.

MIDDLETON, ARTHUR, 1685–1745 about, was the son of Edward Livingston, and an eminent member of the South Carolina colony. The proprietary system, which existed under the royal charter, was obnoxious to the colonists, and in 1719, under the lead of Middleton, they succeeded in placing themselves under the immediate protection of the crown. He had previously (1712) been made a member of the council; and in 1725 succeeded Nicholson as governor, which position he held for six years, and for the remainder of his life was a member of the royal council.

MIDDLETON, ARTHUR, 1743–48, b. S. C.; educated at Harrow and Westminster, and at Cambridge. On his return to this country he took a prominent part in the affairs of his native state, where his family possessed large estates and exerted a great influence. His father, Henry Middleton, had been president of congress in 1775, and he himself, after serving with distinction on the first committee of safety, was sent by his native state in 1776 to congress, where he signed the declaration of independence. He remained in congress till 1777; and two years later, after refusing the governorship of South Carolina, he joined in the defense of Charleston. The British troops pillaged his plantation, one of the most valuable in the state; and in 1780 he was made prisoner at the capture of Charleston. His plantation was confiscated, and he was confined first at St. Augustine, and afterwards in the Jersey prison ship till near the close of 1780, when he was exchanged. He was again returned to congress, where he remained till the war was closed. He was afterwards a member of the senate of his native state. His writings are confined to a number of essays on political subjects, published under the pseudonym of "Andrew Marvell." To his skill as a stenographer we are indebted for a report of many debates in which he took part, and whose records would otherwise have been lost to us.

MIDDLETON, CONYERS, D.D., a well-known divine and scholar of the church of England, was b. in 1683 at Richmond, in Yorkshire. He studied at Cambridge, where he took the degree of B.A. in 1702, was elected a fellow in 1706, and shortly after married a lady of fortune. His life was a series of bitter, and, on the whole, not very creditable controversies, though he is said to have been rather a likable person in private. His first and most formidable opponent was Richard Bentley (q.v.); afterwards his polemics

were chiefly of a theological character. The views he expressed and defended were generally such as to draw down upon him the imputation of being an "infidel in disguise," though some of them—such as that the Jews borrowed some of their customs from Egypt, and that the primitive writers in vindicating Scripture found it necessary sometimes to recur to allegory—are now established beyond all doubt; while a third opinion, viz., that the Scriptures are not of absolute and universal inspiration, has since Middleton's day been adopted by many of the most learned and accomplished divines even of his own church. Middleton died at Hildersham, in Cambridgeshire, July 28, 1750. His principal writings are *The History of the Life of M. Tullius Cicero* (2 vols. 1741), a work both interesting and valuable, but neither very impartial nor quite accurate. His celebrated *Letter from Rome, showing an exact Conformity between Popery and Paganism; or the Religion of the present Romans derived from that of their Heathen Ancestors* (1729), provoked the most violent indignation among Roman Catholics, and is still read with interest. All his pamphlets, treatises, etc., were collected and published under the title of *Miscellaneous Works* (4 vols. Lond. 1752–57), and contain much that is curious and valuable on theological and antiquarian topics.

MIDDLETON, EDWARD, 1640–1700 about, the first of a family well known in the political history of this country, and especially of South Carolina. He was born in Twickenham, England, from which place he emigrated to this country and took up his residence in South Carolina, being one of the very earliest settlers. Here he took an active part in the affairs of the young colony and was useful not only from his great wealth but also from his political sagacity. He was of very liberal tendencies, and seems to have foreseen the separation of the colonies from the mother country. In 1680, ten years after the settlement of the colony, he was a member of the council under the lord-proprietors.

MIDDLETON, HENRY, 1771–1846, was the son of Arthur Middleton, signer of the Declaration of Independence, and was b. in Charleston, S. C. He was a member of the state legislature 1801–10; was then elected governor of the state and in 1815 was elected to congress, where he served two terms. In 1820 he was appointed U. S. minister to Russia, in which capacity he served for about ten years and on his return to this country retired from public life.

MIDDLETON, HENRY, b. not far from 1700, son of gov. Arthur Middleton, and like all his family, took much interest in the political affairs of the state. He is chiefly known as president of the congress of 1775, to which he was sent as a delegate by the colonial convention of South Carolina; and notwithstanding his great age at the time was an active and efficient supporter of the revolutionary measures.

MIDDLETON, THOMAS, d. 1626, b. England; lived in the reigns of Elizabeth, James I., and Charles I. Very little is known of his life beyond the fact that he was made chronologer to the city of London in 1620. His earliest known piece belongs to 1602 and his latest, to 1626. The best of his numerous plays are *A Mad World my Masters*, and *The Roaring Girl*. The latter is interesting from the picture it contains of the London life of that day. Its heroine was an actual person, the notorious Moll Cutpurse, who also figures in the *Amends for Ladies* of Field, a contemporary of Middleton. Another play of Middleton's, *The Witch*, is supposed to have furnished or suggested to Shakespeare, some of the incantation scenes of Macbeth. A tragedy founded upon the story of Bianca Capello is distinguished by a forcible action. The comedy, *A Trick to Catch the Old One*, is full of spirit and humor, as are most of Middleton's comedies. His language is often coarse, and his characters repulsive; he has little skill in the construction of a plot, but his works are full of life. He displays a richness of humor in his comedy, and an occasional power of imagination in his tragedy, which entitle him to a high rank among the Elizabethan dramatists of the second class. He worked with Rowley on the composition of *The Fair Quarrel*, *The Spanish Gipsy* and *The Changeling*, with Rowley and Massinger on *The Old Law*, and with Fletcher and Jonson wrote *The Widow*, printed in Dodsley's *Plays*.

MIDDLETON, THOMAS FANSHAWE, D.D., 1769–1822, b. England; educated at Christ's hospital, and Cambridge, and ordained in the English church in 1792. He was appointed to the curacy of Gainsborough in Lincolnshire, where for a time he edited a periodical called the *Country Spectator*. In 1794 he acted as tutor to the sons of the archdeacon of Lincoln, Dr. John Prettyman, who presented him in 1795, to the living of Tansor, in Northamptonshire, whence he was transferred in 1799, to St. Peter's, Mancroft. In 1802 he became rector of Bytham, in Lincolnshire, and began his most important book, a treatise on the *Doctrine of the Greek Article*, which appeared in 1808. In 1811 he became vicar of St. Pancras, Middlesex, and in 1814 was consecrated first bishop of Calcutta. In this capacity he did much to promote the advancement of Christianity and education. He founded the bishop's college at Calcutta in 1820, to educate missionaries and clergymen for the English Asiatic possessions, and he established a consistory court at the same place. In his book on the Greek article, after laying down the rules to which it is subject, and applying them to New Testament interpretation he attempts the discussion of passages from which the divinity of Christ may be argued for or against, according to the special force of the Greek article in that particular connection. The

work created considerable theological discussion, and was opposed by a number of Unitarian writers.

MIDDLETOWN, a city and township in Connecticut, United States, at the head of navigation, on the right bank of the Connecticut river, 23 m. from its mouth. It is a well-built town, with a handsome custom-house, Wesleyan university, episcopal seminary, 16 churches, four banks, 3 cotton factories, foundries, mills, etc. Pop. of city in 1870, 6,923.

MIDDLETOWN (*ante*), a city in s. Connecticut, incorporated 1874; on the Connecticut Valley railroad and the Boston and New York Air Line, at the terminus of a branch of the New York, New Haven and Hartford railroad; pop. '80, 11,731. It is a port of entry, admitting to the wharves vessels drawing 9 ft. of water. It is a stopping place for the New York and Hartford steamboats, daily line. It is built on rising ground, commanding a fine view of charming environs, and is situated on the w. bank of the Connecticut river, 31 m. above its mouth, directly s. of one of its small branches, and is one of the county seats of Middlesex county. It is regularly laid out, with wide streets at right angles; buildings principally of brick, and residences, particularly on the hills, having spacious grounds, tastefully ornamented. Main street, in the mercantile quarter, is a wide and level thoroughfare, and High street contains the most fashionable residences. The streets are well shaded by trees. It contains a court-house, built of Portland freestone; 6 hotels, 7 banks—4 national—with an aggregate capital of $969,300, and 3 institutions for savings, having $8,000,000 of deposits. It has a custom-house, 5 newspapers, 15 churches, and a public library. It is the seat of Berkeley divinity school (Episcopal), established in 1854, having a library of 14,000 vols.; also of the Wesleyan university (Methodist), organized 1831, having a library of 25,000 vols., a valuable cabinet, and fine telescope; and has excellent public schools. In the suburbs are the commodious buildings of the state general hospital for the insane, and it has also the state industrial school for girls. In the vicinity are valuable mineral deposits: feldspar, columbite (very rare), gold, silver, and an abandoned lead-mine opened in revolutionary times. It is 15 m. s. of Hartford and 24 m. n.e. of New Haven, at an equal distance from New York and Boston. It is the center of an important trade; has some shipbuilding, and various manufactures—among them britannia ware, silver-plated ware, cotton goods, sewing-machines, rules, chisels, guns, screws, etc. Across the river is the t. of Portland, connected with it by an iron railway bridge of the Boston and New York Air Line.

MIDDLETOWN, a village in Orange co., N. Y., the terminus of the New Jersey Midland railroad, at the junction of the Erie railroad with the New York and Oswego Midland railroad; pop. '70, 6,049. It is a part of the township of Wallkill, and is on the Wallkill river, built on the long, sloping sides of low hills. It is 24 m. w. of Newburg, and 66 m. n.w. of New York by rail. The Shawangunk mountains, a portion of the Appalachian system, lie at the w. of it, and on the e. are the highlands of the Hudson. It has 9 churches, 2 national banks, a savings-bank, several public halls (1 masonic), a public library and reading-room, a union school, Wallkill academy, and several private schools; and it is the seat of the state asylum for the insane (homeopathic) established 1874. It has an opera-house, two hotels, and 4 newspapers. Its streets are wide, ornamented with shade-trees, well sewered, and lighted by gas. It has an efficient fire department and police force. Its water-works conduct its water supply 2 m. from lake Monhagan, the reservoir containing 80 acres, situated nearly 200 ft. above the level of the village. In the s.w. portion is Hillside cemetery, a beautiful spot containing 50 acres, well laid out and carefully tended. Its leading industries are the manufacture of wool hats, blankets, saws, files, carpet-bags, furnaces, agricultural implements, lawn mowers, gloves, patent medicines, etc., and it is the center of an important country trade in garden produce and stock.

MIDDLETOWN, a t. in Dauphin co., Pennsylvania, 9 m. s.e. of Harrisburg, at the mouth of Swatara creek, on the e. side of the Susquehanna, and the Pennsylvania railroad and Union canal, and connected by ferry with the Middletown ferry station on the Northern Central railroad; pop. '70, 2,980. It has a number of churches, newspapers, a bank, and an orphan asylum. There are grist, planing, and saw mills, car and machine shops, and a foundry.

MIDDLEWICH, a small market t. of England, Cheshire, on the Grand Trunk canal, 20 m. e. of Chester. Salt is extensively made; boat-building is carried on, and brick-works are in operation. Pop. '71, 3,085.

MIDGE, the common name of many species of small dipterous insects, of the family *tipulidæ*, much resembling gnats, but having a shorter proboscis. Their larvæ are aquatic; the perfect insects are often very annoying both to human beings and to cattle. The little pink-colored tortuous worm known to anglers as the *blood-worm*, frequent in water-barrels and in the mud near the edges of ponds and ditches, is the larva of a species of midge (*chironomus plumosus*), a little larger than the common gnat, very abundant in Britain, particularly in marshy situations. The larva is much sought after both by birds and fishes, and is a very tempting bait for the latter. The pupa is cylindrical, with respiratory organs on the sides of the thorax. When the insect is ready to quit its pupa case,

it rises to the surface of the water and there remains suspended for a short time; the perfect insect, when it has issued from the case, also stands for a short time on the surface of the water. The genus is remarkable for the long hairs with which the antennæ of the male are furnished.—Another genus of midges (*simulia*) contains many species which are most tormenting to men and cattle, by entering the ears and nostrils, and alighting on the eyelids. Several species are British. They swarm on marshes and damp heaths in the warmer months. But none of them is nearly so mischievous as a species (*S. columbaschensis*) found on the banks of the Danube, and so plentiful, that horses and cattle are often suffocated by the numbers which get into the windpipe.

MIDHURST, a market t. and parliamentary borough of England, in Sussex, on the Rother, a navigable tributary of the Arun, 50 m. s.w. of London. Here are the ruins of an old castle of the Bohuns, lords of Midhurst; and within half a mile e. of the town stood Cowdry house, the seat of the Montagues, which, with the exception of the gate-house, was burned down in 1793. Midhurst returns one member to parliament. Pop. (1861) of parliamentary borough, 6,405; (1871) 6,753.

MIDIANITES, an Arab race, descended, according to Scripture, from Midian, the son of Abraham by Keturah. They occupied the greater part of the country between the n. side of the Arabian gulf and Arabia Felix as far as the plains of Moab. Others more civilized (if not, indeed, of Cushite origin) dwelt in the vicinity of the Sinaitic peninsula, and carried on a trade, particularly with Egypt. To the latter, we may presume, belonged Jethro, priest or "sheik" of Midian—the father-in-law of Moses. The Midianites were very troublesome neighbors to the Israelites till Gideon's victory over them. Their national god was Baal-Peor.

MIDLAND, a co. in central Michigan, intersected by the Flint and Père Marquette railroad; 550 sq.m.; pop. '80, 6,894—5,158 of American birth, 26 colored. It is drained by the Tittibawassee river, formed by the union of the Chippewa, Pine, and Tobacco rivers within its limits. Its surface is generally level prairie, largely covered with building timber, with groves of sugar maple, and pine growing on the low hills. Lumber is one of the chief commodities, and is largely exported. Its soil is fertile in some sections, producing oats, Indian corn, potatoes, wheat, rye, and the products of the dairy. Its soil and climate are favorable for stock-raising. It has manufactures of lumber, salt, and flour. Capital, Midland.

MIDLOTHIAN. See EDINBURGHSHIRE, *ante*.

MIDNAPOOR, a district in s.w. Bengal, forming part of the province of Orissa; 4,015 sq.m.; pop. about 500,000. It is traversed by the Cosai river and many smaller streams. The soil is rich and produces in abundance rice, sugar, tobacco, cotton, and indigo; but much of the district is jungle and the atmosphere is exceedingly unhealthy. Tigers and poisonous reptiles infest the district, and the annual loss of life from this cause is sometimes very large. The inhabitants are in religion partly Buddhists and in part Mohammedans. Midnapoor and Jellasore are the main towns; the former is the capital, and is 65 m. s.w. of Calcutta.

MIDRASH (Heb. *darash*, to search, explain the Scriptures) is the general name given to the exposition of the Old Testament, which for about 1500 years, formed the center of all mental activity, both in and out of the schools, among the Jews after the Babylonish exile. The prohibitions and ordinances contained in the Mosaic records, to which a precise meaning was not in all cases attached, were, according to certain hermeneutical rules, specified and particularized, and further surrounded by traditional ordinances and inhibitions: Halacha (q.v.) = rule by which to go, or the binding, authoritative, civil, and religious law. The chief codes of this are the Mishna (q.v.), Gemara (q.v.), Sifra (an amplification on Leviticus), Sifri (on Numbers and Deuteronomy), and Mechiltha (on a portion of Exodus). Another branch of the Midrash, however, is the Haggada (q.v.), a kind of free poetical homilectics on the whole body of the Old Testament (the Halacha being chiefly confined to the Pentateuch). The chief collections of that part of the Midrash are Midrash Rabba, 700 to 1100 A.D. (on Pentateuch and Megilloth), and Pesikta (700), the extracts from which (Jalkut, Pesikta, Rabbati, Sutarta, etc.) only are known, the original itself never having been printed.

MIDSHIPMAN, the second rank attained by combatant officers in the royal navy. After two years' service as naval cadet, the aspirant becomes a midshipman, which is rather an apprenticeship for his after-naval career than any really effective appointment. The midshipman's time is principally devoted to receiving instruction, both in the ordinary subjects of a gentleman's education, and in the special professional duties of a naval officer. After 1½ year's service as such, the midshipman is required to pass a qualifying examination in geography, history, and general knowledge; and two years later he must pass in French conversation, and in seamanship, steam, and gunnery. He then becomes a sub-lieut. (q.v.); and if 19 years of age, is eligible for promotion to lieut., whenever opportunity offers.

A midshipman only receives 1s. 9d. a day (£31, 18*s.* 9*d.* per annum); he is consequently dependent on his friends for more or less pecuniary assistance until he becomes a sub-lieutenant.

MIDSHIPMAN (*ante*), in the U. S. navy, is the ninth and lowest grade of officers in the line of promotion. The appointments for service are made from the cadet-graduates of the Annapolis naval academy, where the course of study lasts six years, and includes a very thorough training in theoretical and practical navigation, mathematics, the natural sciences, modern languages, etc. Cadets are appointed to the academy on the recommendation of the members of congress for the districts in which they reside, and on conditions similar to those governing the appointments to West Point. Since 1865 ten cadets are also appointed from among the apprentices of the school ships after a competitive examination. After passing the examination of the academy, the midshipmen receive their warrants and enter upon actual service, with the pay of $800 per annum. Promotion to the rank of ensign follows after two years' actual sea duty, and a strict examination before a board of three captains and two commanders.

MIDSUMMER DAY, one of the four English quarter-days for payment of rent by tenants, viz., June 24. See LANDLORD AND TENANT.

MIDSUMMER EVE. See JOHN'S (ST.) EVE.

MIDWIFE,—MIDWIFERY. Midwife (Anglo-Saxon, *med-wif*, meaning probably a woman hired for *mede*, or reward) is the name applied to a woman who assists in parturition or delivery. From this is derived the term *midwifery*, for that department of medical science which concerns itself with delivery, and its allied subjects. Writers who prefer words derived from Latin and Greek roots to such plain old English words as midwifery have substituted for it *obstetrics* (Lat. *obstetrix*, a woman who stands near, a midwife), and *tokology* (Gr. *tokos*, child-birth), or *gynækology* (Gr. *gyne*, woman); for a male practitioner in this line of the medical art the French name *accoucheur* is used; and recently an obnoxious new verb, *to accouch* (Fr. *accoucher*, to deliver a woman), has made its appearance in medical literature.

Midwifery, as a branch of medical science, is understood to include the study of the anatomy of the parts of the female body concerned; the doctrine of conception and of sterility, and the signs and duration of pregnancy; parturition in all its varieties; and the diseases peculiar to the puerperal state. To enter into details of such matters would be out of place in this work. With regard to parturition itself, it may be interesting to remark that in a vast majority of cases the labor is what is called "natural," that is, the child presents itself in the normal position, and unaided nature completes the delivery within 24 hours with safety to the mother and child. Dr. Smellie calculated that 990 in 1000 are "natural" labors; and the later statistics of Dr. Collins, based on 15,850 cases, give a similar result—viz., 983 in 1000.

"Unnatural" labor arises either from malformation, disease, or weakness on the part of the mother, or from abnormal conditions of the child; and manual or instrumental aid becomes necessary to prevent the labor from being dangerously prolonged, or—in the more extreme cases—to render delivery at all possible. Of instrumental applications, by far the most important and frequent is that of the forceps (q.v.), which is not intended to injure either mother or child. In 123,295 cases of labor attended by British practitioners, there were 342 forceps cases, or 1 in 360; of these about 1 in 21 proved fatal to the mother, while 1 child in 4 was lost. In craniotomy the head of the child is intentionally destroyed, with a view to save the life of the mother, the death of both being otherwise inevitable. Among British practitioners this operation is not often resorted to; it proves fatal to about 1 mother in 5¾. See also CÆSAREAN OPERATION.

History.—From all the passages in the Scriptures where midwifery is referred to, it is plain that women were the only practitioners of this art among the Hebrews and the Egyptians (see Gen. xxxv. 17, and xxxviii. 28, and Ex. i. 15–21), and it is equally certain that the Greeks and Romans confided this branch of medicine to women. Phanarete, the mother of Socrates, was a midwife; and Plato explains the functions and mentions the duties undertaken by these women. The Greek and Roman physicians were not ignorant of midwifery, for Hippocrates refers to the necessity of turning the child in certain cases, although his doctrines on this point, as also on the management of the placenta, are replete with danger, and Celsus, nearly four centuries later, treats of the mechanism of labor with great clearness. A gradual increase in the knowledge of this subject may be traced in the writings of Aëtius and Paulus Ægineta, who advocates the operation of craniotomy in certain cases. Rhazes seems to have been the first to advocate the rupture of the membranes, when, by their toughness, they impede labor; and Avicenna gave the first description of an instrument partially resembling the more modern forceps.

At the commencement of the 16th c. Eucharius Rhodion published a little book which soon acquired a great celebrity. It was translated from the original high-German into Latin, French, and English, and is remarkable as being the first book published on this subject in England. Its title is *The Byrth of Mankynde, otherwise named the Woman's Book*, by Thomas Raynold, physician (London, 1540), and it contains no external evidence that it is a mere translation. In 1573 Ambrose Paré published a small work in which he showed that foot-presentations were not dangerous, and that in mal-presentations it was better to deliver by the feet than to attempt to bring down the head.

In the early part of the 17th c. the *sage-femme* (the French term corresponding to our English midwife) of Marie de Medicis published a collection of observations on mid-

wifery. About this time (probably about 1640) Dr. Paul Chamberlen, an English physician, invented* the forceps with separate blades, such as are now used. The Chamberlen family (the father and three sons) did not, however, publish their discovery, considering that they had a right to use the secret in the way most to their own advantage; and the exact nature of their instruments was not known till 1815, when the tenant of a house near Maldon, in Essex, where Dr. Peter Chamberlen, one of the sons, had resided more than a century previously, accidentally discovered a concealed space, in which were, *inter alia*, a collection of obstetric instruments, including a double-bladed forceps and a vectis, which are now in the possession of the London medico-chirurgical society. Although Chamberlen's celebrated *arcanum* was doubtless the double-bladed forceps, he seems, therefore, also to have been the discoverer of the vectis or lever. In 1668 Mauriceau's Treatise appeared, which ran through seven editions, and was for a long time the standard work on the subject. He gives a very full account of the process of labor; and, his book having been translated into English, in 1672, by Hugh Chamberlen, became widely known in this country. This seems to have been the time when men began to engage generally in the practice of midwifery; Harvey, the Chamberlens, and others, taking it up in England; while La Vallière, the mistress of Louis XIV., did much to establish the practice in France by employing Julian Clement, a surgeon of high reputation, in her first confinement in 1663.

The last point requiring notice in the history of midwifery in the 17th c., is the discovery of the use of ergot of rye in accelerating parturition. In 1688 Camerarius stated that midwives in some parts of Germany were in the habit of employing it for this purpose; but it is not till 1774 that we find any further reference to the use of this drug.

In the early part of the 18th c. different varieties of forceps, closely resembling Chamberlen's instrument, were invented by Giffard, Chapman, and others; Chapman being, as it is believed, the first public teacher of midwifery in London. About the middle of this century lived sir Richard Manningham, who devoted himself to this branch of the profession, and established a small hospital for the reception of parturient women, which was the first of the kind in the British dominions. It is scarcely necessary to enter into further historical details, as midwifery was by this time fully recognized as a branch—although then and long subsequently considered as the lowest branch—of medicine. The names of Smellie, William Hunter, Denman, and Bland in England, and of Astruc and Baudelocque in France, are well known as promoters of various departments of the art of midwifery towards the close of this century.

In the present century the art of midwifery has steadily progressed. The by-laws precluding practitioners in midwifery from the fellowship of the London college of physicians, and other equally offensive rules in other institutions, have been repealed; there are professors of, or lecturers on, midwifery in all our medical schools (excepting at the universities of Oxford and Cambridge); and a knowledge of this department of medicine is now required from every candidate for the medical profession. And not only are the members of the medical profession compelled to be as well versed in midwifery as in medicine or surgery, but the ignorant midwives of past times are now replaced by comparatively well-educated nurses, with diplomas, certifying that they have regularly attended lectures on midwifery, and have taken personal charge of a certain number of labors under the superintendence of a qualified teacher. And that properly educated women are capable of undertaking all the responsibilities of this department of practice is shown by such cases as those of mesdames Boivin and Lachapelle, who (to use the words of prof. Velpeau), "although the pupils of Baudelocque, were not afraid to shake off, to a certain extent, the yoke of his scientific authority, and whose high position and dignity form the starting-point of a new era for the science of obstetrics in Paris."

MIE'RIS, FRANS, the elder, 1635–81; b. Holland; studied under Abraham Toorne Vliet, a celebrated Dutch designer, and afterwards under Gerard Dow, who called him the prince of his scholars. The subject which Mieris most frequently treats is domestic life. He was a brilliant colorist, and superior to Dow himself in his treatment of stuffs and textures, particularly rich materials like velvet and satin. His pictures are rare and command a high price. His portrait of the wife of Cornelius Plaats is considered one of his finest works. The Florence gallery has many of his pictures. His son, WILLIAM, 1662–1747, was also an artist. He had attained a considerable degree of skill under the direction of his father, upon whose death he turned his attention to making studies from nature. His earlier works portray domestic scenes, in the manner of his father; afterwards he took up historical and romantic subjects. His painting of Rinaldo sleeping in the lap of Armida, surrounded by the loves and graces, was so successful that he treated the same subject three times afterwards. He also painted in landscape and modeled in clay with considerable skill. His landscapes are not always natural, and in his historical compositions his costumes are often inappropriate. He is surpassed by his father in elaboration and exactness, but surpasses him in the brilliancy of his coloring and the

* The exact date of this important invention is not known, but in 1647 Dr. Peter Chamberlen published a pamphlet entitled *A Voice in Rhama*, in which he speaks of his father's (Dr. Paul Chamberlen) discovery for the saving of infantile life. Hence the forceps must have been invented in the first half of the 17th century.

representation of natural objects. FRANCIS MIERIS, sometimes called Francis the younger, 1689–1763, was the son of William, with whom he studied art. But he never attained high rank as an artist, his efforts in that direction being mostly confined to copying the pictures of his father and grandfather. His tastes were for historical and antiquarian researches.

MIEROSLAWSKI, LUDWIK, 1814–78; b. France; son of a Polish officer in the service of France, his mother being French. He received his education at the military school in Kalisz, and when only 16 years of age united himself with the Polish insurgents. This was at the beginning of the revolution of 1830, and Mieroslawski distinguished himself greatly, and was made an officer, serving through the campaigns of 1831 and until the fall of Warsaw, when he settled in Paris. Here he devoted himself to historical and other writing, publishing a number of books in Polish and French, particularly a military history of the revolution in Poland. He became the central figure of the club of Polish refugees in Paris, and, in 1846, took the command of another revolutionary movement, which failed, and resulted in his imprisonment and sentence to death. The outbreak of the general revolutionary movement of 1848 on the continent saved him from this fate, and he repaired at once to Poland on being released from prison in March of that year, and fought in a number of well contested engagements, gaining a complete victory at Miloslaw. But the insurgents were at length subdued, and Mieroslawski resigned his command. In the following year he was in command of the revolutionary movement in Sicily, and was wounded at Catania. He was next heard of in Baden fighting the Prussians, but here also he was unsuccessful, and after the capture of the fortress of Rastadt, in which he had taken refuge, he once more retired to Paris. The Polish insurrection of 1863 brought him again to the front, but only to be defeated in the battle of Raziejewo, after which he retired finally to France, and devoted the remainder of his life to political writing.

MIFFLIN, a co. in central Pennsylvania, drained by the Juniata river and its branches, and intersected by the Pennsylvania railroad and two local branches, and also by the Pennsylvania canal; 375 sq.m.; pop. '80, 19,577—19,090 of American birth. There are many hills, but in the valleys the soil is very fertile; wheat, oats, Indian corn, and potatoes being the staples. There are factories of woolen goods, axes, tools, clothing, harness, and saddles, 6 flour mills, and 11 tanneries. Co. seat, Lewiston.

MIFFLIN, THOMAS, 1744–1800; b. Philadelphia, of Quaker parentage. He received his education in the university of Pennsylvania, and in a business establishment. In 1765 he visited Europe, and on his return joined his brother in a copartnership, and rapidly attained to position and influence. In 1772 and the following year he was a member of the legislature, and in 1774 a delegate to the first congress. He was commissioned a maj. in one of the first regiments raised in Philadelphia for the war, and was aid-de-camp to gen. Washington, with the rank of col. He was rapidly promoted, becoming in succession quartermaster-gen. and adj.gen.; and commissioned brig.gen. May 16, 1776, and maj.gen. Feb. 19, 1777. During the retreat from Long Island he commanded the covering party, and was afterwards prominent in going through the country arousing the patriotism of the people by stirring appeals; he was enabled by this means to bring essential aid to gen. Washington before the battles of Trenton and Princeton. He became dissatisfied after the New Jersey campaign, and engaged in opposition to the commander-in-chief, being a prominent member of the movement known as the "Conway cabal." He was elected a delegate to congress in 1782, and became its president the following year. He was a member and speaker of the Pennsylvania state legislature in 1785, and a delegate to the constitutional convention of 1787. He held various state positions until 1791, when he was made governor, holding the office until 1800. He contributed greatly to the suppression of the whisky insurrection in 1794.

MIGNE, JACQUES PAUL, b. in St. Flour, Cantal, in 1800; educated at Orléans. In 1824 he became a priest and performed the functions of his office till 1833, when a pamphlet published by him, entitled *De la Liberté, par on Prêtre*, brought upon him the censure of the bishop of Orléans, who forbid its publication. Migne quit his pastorate, went to Paris, and the same year established *L'Univers Religioux*, designed to harmonize the church with the free spirit of civil government; but pleasing neither extreme his journalistic venture was assumed by others, and he commenced the publication of a collection of works entitled *Cours Complets de Théology et d'Ecriture Sainte*, and founded a publishing house on a large scale called *D'Imprimerie Catholique*, designed to furnish standard religious works at a low price. He established the daily *Verité*, which in 1856 became the *Courrier de Paris*. In 1861 he founded the weekly *Verité*, a religious journal. The publishing house was burned in 1868: 3,044,152 francs insurance received indicates the extent to which the establishment had grown. It was immediately rebuilt, Migne remaining its chief director. The *Cours Complet*, etc., first mentioned, finally grew into an immense series of volumes of standard authors under the general head of *Bibliotheque Universelle du Clergé et des Laïques Instruits*. The different parts of this series have had an immense sale.

MIGNET, François Auguste Alexis, a French historian, was b. May 8, 1796, at Aix in Provence, studied law in his native city along with Thiers, and went to Paris in 1821 to devote himself to a literary life. He found employment in writing for the public journals, and having given lectures on modern history, which were received with great approbation, he was induced to write his *Histoire de la Révolution Française* (2 vols. Par. 1824; 10th edition, 1840), a work in which that great event is regarded less in its moral than its philosophical aspects. It has therefore been reproached with leading to fatalism. His style is brilliant but academic. After the revolution of 1830 he became a counselor of state, and keeper of the archives of the ministry of foreign affairs; but lost these offices in 1848, since which time he has lived in retirement. He has edited *Négociations relatives à la Succession d'Espagne sous Louis XIV.* (4 vols. Par. 1836–42), to which he prefixed a masterly historic introduction. Among his later works are *Histoire de Marie Stuart* (2 vols. Par. 1851), and *Charles Quint, son Abdication, son Séjour et sa Mort au Monastère de Yuste* (1854); *Eloges Historiques* (1864); and *Rivalité de François I. et de Charles V.* For a *Histoire de la Réforme, de la Ligue, et du Règne de Henri IV.* he is said to have collected hundreds of volumes of manuscript correspondence.

MIGNONETTE', *Reseda odorata*, a plant of the natural order *resedaceæ*, a native of the n. of Africa, in universal cultivation on account of the delicious fragrance of its flowers. It is, according to circumstances and the mode of cultivation, an annual or a perennial, and even half-shrubby plant, with lanceolate entire or trifid leaves, and erect terminal racemes of small whitish flowers, which have the calyx 6-parted, and as long as the corolla; the capsules 3-toothed. It is to be seen during summer in almost every garden, and during winter in almost every green-house in Britain; it is often cultivated in flower-pots in apartments, and no flower is so common in the boxes which are placed outside of windows in towns. Yet it was first introduced into England by lord Bateman, who brought it from the royal garden at Paris in 1752; nor had it then been long known in France. It rapidly became a universal favorite throughout Europe. The French name mignonette, now its popular name everywhere, signifies *little darling*. What is called *tree mignonette* is not even a distinct variety, but merely the common kind trained in an erect form, and prevented from early flowering by pinching off the ends of the shoots.—Weld (q.v.) belongs to the same genus.

MIGRATIONS OF ANIMALS, which must not be confounded with their diffusion over a more or less extended area, are apparently always guided by an instinct operating on all, or nearly all, the individuals of a species, and leading them to move in a definite direction in search of food or (in the case of fishes) of a fit position for spawning.

Among mammals, such migrations are comparatively rare. The most remarkable instance is that of the lemmings, which at no definite epochs, but generally once or twice in a quarter of a century, traverse Nordland and Finmark in vast hosts, ending their career in the western ocean, into which they enter, and come to a suicidal end; or, taking a direction through Swedish Lapland, are drowned in the gulf of Bothnia. M. Martins, who was a member of the great scientific Scandinavian expedition, seems to doubt the generally entertained view of these animals casting themselves into the Western ocean, and believes that most of them perish from the cold in crossing the rivers, while many are killed by dogs, foxes, and a species of horned owl (*strix brachyotos*), which in large numbers always accompanies these emigrations.

According to Gmelin, the Arctic fox (*vulpes lagopus*) always accompanies the lemmings in such numbers that, on this ground, it is entitled to be considered a migratory animal; but independently of these special migrations, it is stated by sir James Ross that "the young generally migrate to the southward late in the autumn, and collect in vast multitudes on the shores of Hudson's bay; they return early the following spring to the northward, and seldom again leave the spot they select as a breeding-place."

The spring-bok (*antidorcas euchore*) is accustomed to make pilgrimages from one spot to another in the vast plains of southern Africa. Herds of many thousands are led by their chiefs in these migrations, and the wonderful density of the moving mass may be imagined from the fact that a flock of sheep has been inextricably entangled and carried along without the possibility of escape. Want of water is said to be the cause of these migrations, but Dr. Livingstone thinks that there must be other causes.

The occasional incursions of wolves, in very severe winters, into districts in which they are not commonly found, and the long excursions of large groups of monkeys (*eriellus* and *rhesus*), hardly fall within the scope of this article.

Many of the cetacea are probably migratory. "The migrations of the porpoise (*phocœna communis*) appear—says Marcel de Serres in his prize-essay, *Des Causes des Migrations des divers Animaux*, p. 63—to be as periodic as those of certain species of birds. During the winter, they constantly proceed from n. to s.; and when they feel the warmth of summer, they turn northwards. Thus they are common in summer in Greenland, while they are rare on our own coasts, where they abound in winter."

The number of species of birds that periodically migrate is so great that it is impossible to find space for a list of them. Marcel de Serres, in the work already quoted, gives a "Tableau de l'Epoque des Passages des Oiseaux," which extends over nearly 100 pages. See Birds of Passage. The desire for a suitable temperature and the search for their proper food are the apparent causes stimulating birds to these migrations; and in most

instances especially in the case of insectivorous birds, the food is intimately associated with the temperature.

The migrations of many species of fishes are as remarkable for their regular periodicity as those of birds. In some cases, fishes that are produced in fresh-water streams migrate to the ocean, and after spending some time in salt water, return (generally, with singular instinct, to their own birthplace) to fresh water to propagate their species. Some of these fishes—as, for example, the lamprey (*petromyzon marinus*)—spend most of their lives at sea, and others, as the salmon, in fresh water. The remarkable migrations formerly, but erroneously supposed to be made by herrings, are noticed in the article on that fish. Many fishes of the same family as the herring, the *clupeidæ*—as, for example, the sprat and pilchard—leave the deep sea for shallow water during the spawning period, when they approach our coasts in vast shoals. All such migrations as these seem mainly due to a reproductive impulse. See FISHES, LAND-CRAB.

Amongst insects, the locust (*locusta migratoria*) is most remarkable for its migrations. These insects are probably produced much more abundantly some years than others, and as in such years their birthplace cannot afford them sufficient vegetation, they are led to migrate in search of food. Some idea of the occasional extent of their wanderings may be formed from the fact that, in the early part of 1810, myriads of locusts appeared in Bengal, from whence they proceeded westward completely across the great Indian peninsula to Guzerat and the neighboring provinces, from whence they pursued their course southwards towards Bombay, the whole period of their migration extending over between two and three years; while, in relation to their numbers, capt. Beaufort calculated a swarm that appeared at Sardis, in Asia Minor, in 1811, at upwards of 168,000,000,000,000.

MIGUEL, Dom MARIA EVARIST, b. at Lisbon Oct. 26, 1802, was the third son of John VI. of Portugal. He spent his early years in Brazil, unrestrained and uneducated. When he returned with the royal family to Portugal in 1821, he could neither read nor write, and showed no talent for anything but fencing. He joined his mother, Charlotte Joachime of Spain, in her plots for the overthrow of the constitution and the establishment of a despotic government; part of the scheme being, that his weak father should be either formally deposed, or virtually deprived of all power. The aged marquis of Loulé, the faithful servant of the king, having been removed out of the way by assassination, Miguel, as infant-generalissimo, caused the ministers to be arrested, April 30, 1824, and his father to be closely watched in his palace; but the plot failed, and Miguel and his mother were banished. He led for some time a remarkably wild and profligate life in foreign countries. After the death of his father in 1826, the queen's party set forth a claim to the throne on his behalf, as his elder brother, Dom Pedro, was emperor of Brazil; and on May 2, 1826, Pedro resigned the crown of Portugal in favor of his eldest daughter, Donna Maria da Gloria, proposing that her uncle Miguel should be her husband, and regent of the kingdom till her majority, to all which Miguel agreed. But queen Joachime's party had everything prepared for the restoration of absolutism. Miguel was declared king of Portugal. War ensued, and at first Miguel was victorious. He carried into full effect the principles of his party by a system of the most severe repression of all liberalism, and signalized himself by the most extreme tyranny of every kind, whilst his own life was one of the wildest excess. In 1832 Dom Pedro took Oporto, and his arms gradually prevailing, Miguel was obliged to sign a capitulation at Evora, on May 26, 1834, by which he resigned all claim to the throne of Portugal, and agreed to retire altogether from the country. But scarcely had he been conveyed to Genoa, when he protested against this deed, and consequently all his estates in Portugal were confiscated, and an annual pension which had been secured to him was stopped. He went to Rome, where the papal government acknowledged him as rightful king of Portugal, solely because he had petted the Portuguese priesthood in his war against the national liberties. Latterly he lived at the castle of Bronnbach, in Baden, where he died Nov., 1866.

MIKADO. This is the popular title of the emperor of Japan, though in official documents the term tenno (heavenly king) or tenshi (child of heaven) are most frequently used. Other titles used in the native parlance or literature are nin-ō (king of men), o-ō or dai-ō (great king), ko-tei (ruler of nations). Other terms, arising from the application of the name of the mikado's place of residence to his person, are: dai-ri (imperial palace), chō-tei (hall of audience), kinri (the forbidden interior), go-sho (palace), which names occur frequently in old European works on Japan. The term mikado means honorable gate, like the Turkish "sublime porte," and the Egyptian "pharaoh." The dynasty of mikados is the oldest in the world, the present ruler Mutsuhito (q.v.), being the 123d of the imperial line. The first mikado was Jimmu Tennō, who began to reign 660 B.C., the professed starting-point of Japanese chronology. The first seventeen mikados in the official list are said to have died at ages ranging from 100 to 141 years. The mikados have each a personal name, but no family name, and the name of any one mikado is never repeated; though in two instances in the list, two mikados reigned each twice, and have each two posthumous titles. Seven of these sovereigns of Japan were females. The average duration of each reign is nearly 21 years. The mikados claim descent from the heavenly gods, and their regalia of sovereignty are a mirror, crystal ball, and sword. The possession of these palladia is the test of legiti-

macy during civil or dynastic war, of which but one is known in Japanese history—the period 1336–92, when a compromise was made by the rival in possession of the regalia receiving the title of ex-emperor, and handing over the sacred emblems to the other. After death, the mikado receives a posthumous title by which he is known in history. The mikado is allowed twelve *miogo* or concubines, besides the empress; and in addition, there are four noble families called shinnō, from whom heirs may be chosen for adoption. Succession is not always to the oldest son, but usually to the mikado's nominee. The imperial household forms a distinct department of the government, called the kunaishō.

MIKA'NIA, a genus of plants of the natural order *compositæ*, nearly allied to *eupatorium* (q.v.). The heads of flowers are 4-flowered, and have four involucral leaves. *Mikania officinalis* is a Brazilian species, with erect stem, and heart-shaped leaves, abounding in a bitter principle and an aromatic oil, and valuable as a tonic and febrifuge. *Mikania Guaco* and *Mikania opifera* also natives of the warm parts of South America, are among the plants which have acquired a high reputation—deserved or undeserved—for the cure of snake bites. They are twining herbaceous plants. *Mikania Guaco* is remarkable for the large indigo-blue spots on the under side of its ovate leaves. The mode of using this plant, which is one of those called GUACO, or HUACO, by the Indians, is by dropping the juice of the fresh leaves into the wound made by a serpent; or little cakes are formed of the bruised plants, which are said to retain their power for a long time. The whole subject requires investigation.

MI'KLOS (ST.) **TOROK,** a t. of Hungary, in the county of Heves, near the Theiss, about 70 m. s.e. of Pesth, with which it is connected by railway. Pop. '69, 13,024, chiefly employed in rearing horses and cattle, and in fishing.

MIKLOSICH, FRANZ, the most learned living Slavist, was b. at Luttenberg, in the Slavic part of Styria, Nov. 20, 1813. After studying law at the university of Grätz, he went, in 1838, to Vienna to practice as an advocate; but in 1844 obtained a situation in the imperial library. In 1850 he was appointed professor of Slavic in Vienna. His principal works are—*Radices Linguæ Palæoslovenicæ* (Leip. 1845); *Lexicon Linguæ Palæoslovenicæ* (Vienna, 1850); *Vergleichende Grammatik der Slaw. Sprachen* (1852–71), a work which has done for Slavic what the works of Grimm and Diez have done for German and Romanic. *Die Bildung der Slaw. Personennamen* was published in 1860; and *Die Zigeuner Europas* in 1872–77.

MI'KNAS, ME'QUINEZ, or MEKNAZA, a t. in the province of Fez, in Morocco, 38 m. w. by s. from the town of Fez, stands in a fertile valley near the Sebu. It is surrounded by triple walls and a moat, is neat and well built, and contains the finest imperial palace in Morocco. This vast pile, erected by the sultan Muley Ismail, is built of marble, and the surrounding grounds are laid out in gardens, said to be the most beautiful in Morocco, and here and there adorned with fountains. Miknas is the summer residence of the sultan. Pop. estimated at from 15,000 to 55,000, who carry on an extensive trade in native produce. The chief manufactures are of painted earthenware and leather. In the vicinity are large plantations of olives.

MI'LAM, a co. in central Texas, drained by the Brazos and Little rivers and many tributaries of the latter, and intersected by the International railroad; 1150 sq.m.; pop. '80, 18,659—3,952 colored. The surface is uneven and hilly, and in large part covered by forests. The staples are cotton, Indian corn, sweet potatoes, wool, and butter. Sheep grazing and cattle breeding are carried on to a considerable extent. Chief town, Cameron.

MIL'AN, a province in w. part of Lombardy in n. central Italy; bounded n. by the province of Como, e. by Bergamo, s. by Cremona and Pavia, and w. by Pavia and Novara; 1155 sq.m.; pop. '72, 1,009,794. It is drained by the Ticino, which separates it from Piedmont on the w., by the Addio on the n., and also by the Lambro, Olona, and other branches of the Po. The province is traversed by railroads leading to Venice, Como, Parma, and Turin. When subject to the Austrian power the area of Milan was but about 746 sq.m., and it was divided into 15 districts; but in the readjustment of boundaries which followed the establishment of Italian unity and the kingdom of Victor Emmanuel, it was considerably enlarged. Besides the capital, Milan, the only town of any size is Monza, 10 m. n.e. of Milan on the river Lambro, which has about 20,000 inhabitants, and is specially noteworthy for its old cathedral. The portraits of all the sovereigns who have worn the iron crown of Lombardy are to be seen at Monza. The surface of the province of Milan is level, it being a part of the great plain of Lombardy, and the country is intersected by many canals for irrigation; by which means the soil is rendered exceedingly productive. The staple products are fruit, corn, rice, and silk. The cattle are unusually fine. There are many flourishing villages, farms, and country seats; and the whole aspect of the province is indicative of great prosperity. It is now divided into the districts of Abbiategrasso, Gallarate, Lodi, Milan, and Monza.

MIL'AN (Ital. *Milano*), the chief city of Lombardy, stands on the river Olona, in the center of the great plain of Lombardy. Pop. (1872) of city, 199,009; of surrounding district, called Corpi Santi, 62,976. From its position on the line of the chief routes of

the central Alps it derives great commercial advantages, while its fine canal system opens for it communication with the principal rivers of Italy. The *Naviglio Grande*, or Grand canal, connects Milan with the Ticino, and the Martesana canal with the Adda. The city, which is almost circular, is encompassed on three sides by walls and low ramparts; it has a circuit of about 7¾ m., and is entered by 10 gates. Notwithstanding its great antiquity, Milan possesses but few remains of its early splendid structures, in consequence of the many calamitous wars by which it has been ravaged. Modern Milan is one of the most opulent and populous cities of Italy; its best streets are regular, wide, and well paved, and kept with scrupulous care; the dwellings are commodious and tasteful, though of a less imposing character than the great feudal Tuscan houses. Milan abounds in churches worthy of note: of these the principal is the famous Gothic cathedral, the *Duomo*, which, with the exception of St. Peter's in Rome, is the most magnificent ecclesiastical structure in Italy. It has a façade of white Carrara marble, and is adorned by 106 pinnacles and 4,500 statues, besides a variety of carvings of unsurpassable beauty. In form it is a Latin cross, with a length of 485, and a breadth of 252 ft. The height of the dome is 355 ft. Its foundation was laid in 1386 by Gian Galeazzo Visconti, and during its erection many of the greatest European architects contributed designs for its embellishment. Within it Napoleon was crowned king of Italy in 1805. Besides the Duomo may be mentioned the church of St. Ambrose (founded by that saint in the 4th c.), the most ancient in Milan, containing inscriptions, sarcophagi, and monuments full of antiquarian interest, and the one in which the German emperors were crowned kings of Italy; the Dominican church of *Santa Maria delle Grazie*, which contains in its refectory the famous "Cenacolo," or "Last Supper," by Leonardo da Vinci; and that of San Carlo Borromeo (1847); of St. Nazaro, which possesses several masterpieces of the best schools of Italian art; and of St. Sebastiano, once a Roman temple.

Among the secular buildings of Milan, the most noteworthy is the magnificent Brera palace, formerly a Jesuit college, and now used for public schools of the fine arts, with the official name of Palace of Arts and Sciences. Within its vast precincts this unique institution includes an academy of art, a choice gallery of paintings of the Bolognese and Lombard schools, a fine collection of casts for modeling purposes, a splendid public library, containing 140,000 volumes, and a rare collection of manuscripts, medals, and antiquities; it has also attached to it an observatory and a botanical garden. Besides the Ambrosian (q.v.), there are several large private libraries. Among the scientific and artistic institutions of Milan are the museum of natural history, the schools of surgery and medicine, especially that of veterinary practice, the celebrated conservatory or school of music, and a military geographical institute, well known for the excellence of the maps it has issued. The educational establishments include four gymnasia, besides normal schools, technical schools, conventual schools, and a seminary. The charitable institutions are numerous and splendidly endowed, having an aggregate property of upwards of £7,000,000 sterling; the *Ospedale Maggiore*, or Great Hospital, founded by the ducal house of Sforza in 1456, accommodates 2,000 patients, and annually admits upwards of 20,000. The Trivulzi hospital, endowed by the Trivulzio family, maintains and clothes 600 aged pensioners. The Milanese places of amusement are on as grand a scale as the other public buildings of the city, the first in point of celebrity being the theater of *La Scala*, which can accommodate 3,600 spectators. The *Corso*, or chief street of Milan, is the universal fashionable promenade of the inhabitants; and the famous arcade, or *Galleria di Cristoforis*, with its brilliant shops and cafés, is also a favorite place of evening resort, and on account of its gay appearance has been called "Little Paris." Milan carries on an immense inland trade in silk, grain, rice, and cheese, and has considerable manufactures of silk goods, ribbons, cutlery, and porcelain.

Milan (Lat. *Mediolanum*) was originally a t. or village of the Insubrian Gauls. It was conquered by the Romans 222 B.C., received the Latin franchise about 89 B.C., and the full Roman franchise 49 B.C. Under the Romans it became a conspicuous center of wealth and civic influence; its citizens were noted for their refined manners and literary tastes, and the public buildings for their beauty and elegance. In the beginning of the 4th c. it was selected as the residence of the imperial court by Maximian. Milan was sacked by the Huns (under Attila) in 452, by the Goths (under the brother of Vitiges) in 539, and passed to the Longobards and Franks previous to its subjection by the German empire. After 961 it was long governed by dukes in the name of the emperors. The feuds of the Guelphs and Ghibellines distracted Milan, like all the other Italian cities. Supreme power became eventually vested in the Ghibelline Visconti, by whom the ascendency of Milan was extended over the whole of Lombardy. From 1545 to 1714 Milan submitted to the successive predominance of France and Austria. Under Bonaparte it was declared the capital of the Cisalpine republic, or the Italian republic, and, finally of the kingdom of Italy. In 1815 Milan was restored to Austria, and continued the capital of the Austro-Italian kingdom until the annexation of Lombardy to Piedmont, in 1850, by the peace of Villafranca.

MIL'AN, ARCHBISHOPRIC OF. Of its early history we have no certain knowledge. There is a tradition that the apostle Barnabas established the Christian church at Milan, and was its first bishop. The first bishop of Milan of whom we have any knowledge is

Auxentius, 355–74. He was the leader of the Arians in the western church. The orthodox bishops, who at a synod assembled at Rome in 369 condemned Arianism, feared to pronounce against Auxentius because he was protected by the emperor Valentinian I., and, though the synod was prevailed upon by Athanasias to condemn him, he remained in his see till his death. The contest arising from the Arian heresy rendered the election of a new bishop very difficult, and Ambrose, the consular prefect, found it necessary to proceed to the church at Milan for the purpose of restoring order. At the close of his speech both the orthodox and the Arians united in a demand that he should be their bishop. He accepted, and acquired great influence with the people and the emperor Valentinian. He vigorously opposed the Arians, and in 382 presided at a synod which deposed the Arian bishops Palladius and Secundianus. All the bishops who succeeded Ambrose were elected by the people. After the overthrow of the Gothic kingdom, the archbishops of Milan, on account of the hostility between the people and the Lombards, their conquerors, resided at Geneva. But afterwards the Lombards became enthusiastic friends of the church, and the archbishops returned to Milan. Though the first bishop in the kingdom, and having the power even of crowning the king with the so-called *iron crown*, the archbishop was yet subject to the king, and the church was subordinate to the state. After the overthrow of the Longobard kingdom, the power of the archbishops of Milan was much reduced, but they subsequently became more independent than before, large feudal estates being bestowed upon them, and they were the most influential allies of the German emperors. Eriberto di Argago, archbishop of Milan 1019–45, organized in 1034 a revolt against the emperor Conrad the Salic, and was expelled. After his death, in the excitement prevailing over the election of his successor, the popular chief Erlanbaldo persuaded the people to select four candidates, from whom a choice should be made. These names were sent to the emperor Henry II. to make the appointment, but influenced by a faction of the nobles he appointed a rival, Guido di Valate. This appointment was disliked, both by the people on whom he was forced, and by the disappointed candidates. Milan was at one time independent of the papacy, the spiritual and temporal power being granted by the emperor. But the German popes began to interfere. Pope Leo IX. and his successors attacked the Milanese clergy, who at that time were allowed to marry, and in a council held at Rheims in 1049 laws were enacted against clerical marriage. Archbishop Guido defended the clergy both by Scripture and by a decision of Ambrose which he cited. The popes sent their emissaries, who excited great tumults in Milan, which Guido, who argued in favor of the married clergy, was unable to quell. The people rose in arms and resisted the papal faction, which resulted in fights and bloodshed. Nicholas II., then pope, sent Hildebrand and Anselm to allay the strife. Anselm was conciliatory, but Hildebrand demanded unconditional submission to Rome. In 1059 another papal legation was sent with full power to compel submission from the archbishop and clergy. These ecclesiastics at first earnestly denied the authority of Rome, but finally acknowledged it, signing a paper in which they expressed their penitence in humiliating terms. But when in 1061, after the death of Nicholas, their fellow-citizen Anselm was elected pope under the name of Alexander II., the church of Milan endeavored to regain its independence. A council of German and Lombard bishops convened at Basle and elected Cadalus, who was bishop of Parma, pope under the title of Honorius II. The German bishops, under the influence of Hanno, archbishop of Cologne, sided with Alexander, and in 1064 the synod of Mantua deposed Honorius. Guido, the archbishop, was excommunicated by the pope in 1066, but disregarding the deposition he appeared at the altar to officiate at the services of Pentecost day. The papal party attacked him in the church. His followers rallied for his defense, but he was nearly killed by the papists. A few months later Guido reorganized his party, and the war continued for several years. Hildebrand finally, in 1069, proposed that the Milanese clergy and laity should take an oath that in future their archbishops should apply for confirmation to the pope, not to the German emperor. Guido, weary of strife, resigned his archbishopric to his sub-deacon Gotefrido. He was confirmed by Henry IV., but the Milanese refused to receive him, and to save his life he escaped from the city. The papal appointee was also rejected, and compelled to swear that he would not attempt to enter the see. Milan was thus without an archbishop. Hildebrand, who succeeded Alexander, issued an interdict against it. The Milanese, disregarding the interdict, appealed to Henry IV. for an archbishop. He nominated Tedaldo, who was consecrated. He was the leader of the disaffected bishops who, at the synod of Pavia in 1076, excommunicated pope Gregory himself. He remained in his see till his death, notwithstanding the frequent excommunications from Gregory. With him ceased the independence of the Milan archbishopric. The clergy of Milan now largely belong to the Old Catholic party. The reforms which they seek are the election of priests by the parish, the use of the vernacular in the church service, the cessation of the worship of Mary and the saints, the marriage of priests, etc. E. Serra Gropelli is the leader of the reform party.

MILAZ'ZO (anc. *Mylæ*), a fortified seaport on the n. coast of the island of Sicily, 18 m. w. of Messina. Pop. '72, 7,744. Its situation is unhealthy. The chief exports are tunny, wine, silk, fruits, corn, oil, and liqueurs. The town is irregularly built, and is considered almost impregnable, owing to the great natural strength of its position and the extent of its military works and citadel. Garibaldi, with 2,500 men, defeated 7,000 Neapolitans here on July 20, 1860, and compelled the garrison to evacuate the fortress.

MILBURN, WILLIAM HENRY, b. Philadelphia, 1823; studied at Illinois college. In boyhood he lost totally the sight of one eye, and partially that of the other, and the skill of the most distinguished oculists in America and Europe failed to restore it. At the age of twenty he was admitted a preacher in the Methodist Episcopal church, his field of labor being chiefly in the southern states, and his pastorates at Montgomery and Mobile, Ala. He is said to have traveled in the period of his itineracy over 200,000 miles. In 1856 he was chaplain to the house of representatives at Washington. In 1859 he visited England with bishop Simpson and Dr. McClintock, where he delivered lectures with great success in the principal cities. On his return he was confirmed in the Protestant Episcopal church, but returned to the Methodist church in 1872. He is well known as the blind preacher, and as an eloquent lecturer. He has published *Rifle, Axe and Saddlebags; Ten Years of Preacher Life; Pioneers, Preachers, and People of the Mississippi Valley.*

MILDEW (Ger. *Mehlthau*, meal-dew), a term of somewhat vague application to certain diseased states of plants caused or characterized by the growth of small parasitical fungi, and also to spots on cloth, paper, etc., and even on the surface of glass and other inorganic substances, produced by the growth of minute fungi. The mildew fungi are numerous, and the name mildew is often given to many that are also known by other names, as BLIGHT, BRAND, BUNT, RUST, etc.; see these heads; see also BOTRYTIS and OIDIUM. Different species or families of plants have their own peculiar parasites; several kinds of parasitic fungus being, however, often known to infest one plant. Probably, the name mildew originally belonged to those molds which form white mealy patches on leaves. Some of these belong to the genus *Erysiphe*, which exhibits fleshy somewhat gelatinous masses, becoming globose *sporangia*, filled with spore-containing *asci*, and surrounded by a flocky *mycelium*, often spreading widely over the leaves and other parts of plants. Maples are sometimes covered with a mildew of this kind, so as to be quite hoary. Similar mildews are often seen on peas and other leguminous plants; also on umbelliferous plants. Sulphur has been found effectual in curing some of these mildews. Many of the most destructive mildews are of a red or brown color, as the mildew of the pear, *Aecidium cancellatum*, that of the barberry, *Aecidium Berberidis*, etc.; whilst some are almost black, as the corn mildew, *Puccinia graminis*, by which the crops are in some years greatly injured.

Whether mildew is the consequence of unfavorable weather and of fungi attacking an already weakened plant, or is the consequence of infection by spores of fungi brought through the air or soil to a plant previously healthy, is not yet well ascertained; and probably the one may be sometimes the case, and sometimes the other. There is no doubt that many kinds of mildew appear chiefly toward the close of summer on leaves in which vegetable life has already in a great measure lost its power.

MILE, the largest terrestrial measure of length in common use among the British and most continental nations, is derived from the Roman *milliare*, which contained 1000 paces (*mille passuum*) of 5 Roman ft. each, the pace being the length of the step made by one foot. The Roman foot being between 11.65 and 11.62 English in., the Roman mile was thus less than the present English mile by from 142 to 144 yards. The length of the modern mile in different countries exhibits a remarkable diversity, not satisfactorily accounted for. Before the time of Elizabeth, scientific writers made use of a mile of 5,000 English ft., from the notion that this was the Roman mile, forgetting the difference in value between the English and Roman foot. The present statute mile was incidentally defined by an act passed in the 35th year of the reign of Elizabeth to be "8 furlongs of 40 perches of 16½ ft. each"—i.e., 1760 yards of 3 ft. each; and it has since retained this value. The *geographical* or *nautical mile* is the 60th part of a degree of the equator, and is employed by the mariners of all nations; but in Germany, the geographical mile denotes $\frac{1}{15}$th part of a degree of the equator, or 4 nautical miles. The following table gives the length, in English statute miles, of the various miles that have been or are commonly used:

	Eng. Miles.
English geographical mile	=1.153
German geographical mile	=4.611
Tuscan mile	=1.027
Ancient Scotch mile	=1.127
" Irish mile	=1.273
German short mile	=3.897
Prussian mile	=4.680
Danish mile	=4.684
Hungarian mile	=5.178
Swiss mile	=5.201
German long mile	=5.753
Hanoverian mile	=6.568
Swedish mile	=6.648
The French kilomètre	=0.621

and 29 kil. =18 English statute miles nearly.

MILES, NELSON A., b. Mass. 1839; received an ordinary education, and took a position in a store in Boston in 1856. When the war of the rebellion broke out, he accepted a commission as first lieut. 22d Mass. volunteers, under date Oct. 1861, and was in the seven days' battles, and the engagement at Charles city cross-road. He was wounded in the battle of Fair Oaks, and again at Malvern hill. Between Fair Oaks and the change of base to Harrison's landing, he acted as adjt.gen. of the 1st brigade, 1st division, 2d army corps. Sept. 30, 1862, he was made colonel of the 61st N. Y. volunteers, and led that regiment at the battle of Fredericksburg. At Chancellorsville, he was dangerously, and, as was supposed, fatally wounded, and carried from the field; he however recovered, and during the campaign before Richmond in 1864, he commanded the brigade in which he had been acting as adjt.gen. His commission of brig.gen. was dated May 12, 1864; and he was brevetted maj.gen. Dec. 1864, for gallantry at the battle of Ream's Station. On Oct. 21, 1865, he was commissioned maj.gen. (volunteers); in July 1866 appointed colonel 40th infantry; transferred to 5th infantry Mar. 15, 1869; and brevetted brig. and maj.gen. U. S. army, Mar. 2, 1867. Since the close of the rebellion, gen. Miles has gained high praise as an Indian fighter, being engaged on the frontier, in the protection of the settlements, and in preserving order among the tribes in and out of the reservations.

MILE'TUS, anciently, the greatest and most flourishing city of Ionia, in Asia Minor. It was situated at the mouth of the Mæander, and was famous for its woolen manufactures, and for its extensive trade with the north. Before being forcibly colonized by the Ionians, it appears to have been inhabited by Carians. Miletus early founded a number of colonies on the Black sea and in the Crimea, possessed a fleet, which sailed to every part of the Mediterranean, and even ventured into the Alantic, and maintained long and expensive wars with the Lydian kings. The "Milesians" were believed to be the purest representatives of the Ionians in Asia. After the conquest of Lydia by the elder Cyrus, it was subdued with the whole of Ionia. It continued, however, to flourish till it was excited to rebellion against the Persians in the Ionian war, and was destroyed 494 B.C. It was rebuilt, but never reacquired its former importance. Miletus has an honorable place in the history of Greek literature, being the birthplace of the philosophers Thales, Anaximander, and Anaximenes, and of the historians Cadmus and Hecatæus.

MILFORD, a t. in s. Connecticut, on the s. shore, with a harbor on Long Island sound, a station on the New York, New Haven, and Hartford railroad, and another at the junction of the Naugatuck railroad with that road; pop. '80, 3,347. It is divided by the Wopewaug river, emptying into the sound; and the Housatonic river celebrated for its beautiful scenery washes its w. border. It is 11 m. s.w. of New Haven, and contains the factories of the Automatic book-sewing machine company, and manufactories of straw goods, boots and shoes, and carriages. It has excellent public schools, 1 newspaper, 1 savings-bank, 5 churches, and 2 hotels.

MILFORD, a village of Mass., 31 m. s.w. of Boston, having 6 churches, a manufactory of machinery, and large boot and shoe manufactures. Pop. '70, 9,890.

MILFORD (*ante*), a t. in e. Mass., on the Boston and Albany railroad, Milford branch, at its junction with the Milford, Woonsocket (R. I.) and Hopkinton railroad; pop. '80, 9,310. It is 18 m. s.e. of Worcester, and 14 from South Framingham. It has 2 banks (1 national), a town-house, 1 newspaper, a public library, and several tanneries. The township includes Milford Center, North, East, and South Milford, and Hopedale, all thriving villages.

MILFORD, a parliamentary borough (contributory to Pembroke) and sea-port of south Wales, in the county of Pembroke, on the n. shore of the haven of the same name, 7 m. e.n.e. of St. Ann's Head. The haven is said to be unequaled as a harbor by any other in the world. It is formed by an estuary running inland for 17 m. to Langwin (which is easily reached by vessels of 2,000 tons), and varying from 1 to 2 m. in breadth. It is protected from winds by a girdle of undulating hills, is deep (from 15 to 19 fathoms in most parts, while the spring-tides rise 25 ft.), easy of access, and capable of anchoring the whole fleet of England in safety. Its distance, however, from the channel, the highway of British commerce, is a serious disadvantage. The merits of the haven have been recognized from the earliest times; but the rise of the town of Milford may be said to have begun with the present century, when docks and quays, together with a mail packet station for Ireland, a dock-yard, ship-building slips, and an arsenal, were established here, only, however, to be removed in 1814. Since that time, with only occasional gleams of prosperity, Milford has been in a declining condition; but the opening of the Milford railway, and the construction of docks and wharfs, have given an impetus to its progress; though the trade of the place is little developed as compared with the capabilities of the haven and the mineral resources in the neighborhood. In 1875, 1262 vessels, of a burden of 263,804 tons, entered the port, and 1173, of 228,030 tons, cleared. Pop. '71, 2,836.

MILFORT, LE CLERC, 1750–1817; better known by his given name, a French adventurer, b. near Méziéres, and d. there. First a fugitive from justice in France he took refuge among the Creeks of Louisiana, where he acquired the title of "great warrior." During the revolution of 1789 he returned to France, and occupied various military positions in the army, where he distinguished himself often by the resources and bravery of

a brigand. In 1802 he published *Mémoires ou Coup d' Œil Rapide sur Mes Voyages dans la Louisiane, et Ma Séjour dans la Nation Creek.*

MILHAU, or MILLAU, a t. of France, in the department of Aveyron, in a rich and fertile dale on the right bank of the Tarn, 55 m. n.w. of Montpellier. During the 16th and 17th centuries it was one of the strongholds of the Calvinists. Leather and gloves are manufactured, and there is a good trade in wool, timber, hides, cheese, and wine. Pop. '76, 14,482.

MILITARY ACADEMY, ROYAL, an establishment at Woolwich, through which must pass all candidates for the royal artillery and royal engineers. The age for entrance is 17, and the vacancies are open to public competition. The pupils are denominated military cadets, and the parents or guardians have to make a considerable payment in regard to each, so long as they remain at the academy; the annual charge for the son of a civilian being £120, that for the son of a naval or military officer less, according to the rank of the father. When the term of instruction—which comprises the subjects of a thorough general education, the higher mathematics, fortification, gunnery, and military duty—is completed, the cadets compete for the vacancies in the engineers and artillery, those who pass the best examination being allowed the refusal of the former corps. Those who obtain commissions in the engineers proceed to Chatham for further instruction (with military pay, however) in their professional functions. The artillery cadets at once join the royal artillery as lieutenants. The vote for the royal military academy for the year 1879–80 was £31,287, of which sum about three-fourths would be made up to the exchequer by the payments for pupils and a contribution from the Indian government.

MILITARY ACADEMY, U. S. See UNITED STATES MILITARY ACADEMY.

MILITARY ASYLUM, ROYAL, an educational government institution at Chelsea, near, but wholly distinct from, the royal hospital for pensioned soldiers. Its object is the suitable education for trade, etc., of 500 male children—generally orphans—of British soldiers. For these there are a model school and an infant school, and the boys have a completely military organization, with scarlet uniform, band, etc. As a result of their training, a large proportion of the pupils ultimately volunteer into the army. The school was originally established in 1803 by the late duke of York, whence it is still commonly known as the "duke of York's school." Originally a similar school for soldiers' daughters was included, but was not found to answer, and has been discontinued. Attached to the school is a training establishment for military schoolmasters, known as the normal school. The total cost of the whole institution is about £11,500 per annum.

MILITARY LAW. See COURT MARTIAL; MARTIAL LAW.

MILITARY FRONTIER (Ger. *Militärgrenze*), the former name of a narrow strip of land along the Turkish frontier of the Austro-Hungarian empire. It had a special military constitution, and formed a separate "crown-land." Of late, however, the peculiar institutions of the Military Frontier have been abolished; portions of the territory have been incorporated with adjoining provinces; and since 1873 the remainder of the Military Frontier, now officially termed the Croato-Slavonic Border-land, forms, along with Slavonia and Croatia, a dependence of the Hungarian crown. The constitution, civil and military, is now accordingly similar to that of the other provinces of the Hungarian part of the empire. The area of the Military Frontier was about 7,500 sq.m., and its pop. in 1869 was 690,300. The breadth of the territory once known under this name is considerable towards the western extremity, but diminishes to only a few miles at the eastern. The surface has an average elevation of upwards of 2,000 feet. All the important rivers flow eastward. The climate is severe in the highlands of the w., but mild in the lower districts towards Slavonia. Maize, wheat, oats, fruits, and vegetables are the principal productions.

The Military Frontier owes its origin as a crown-land to the necessity of having a permanent body of defenders on the borders during former wars, and especially during wars with the Turks. In the 15th c. the Austrians had gained from the Turks certain tracts of territory on the banks of the Save and Danube. These tracts they colonized, making it, however, a condition that the colonists must render military service against the Turks. Thus originated the capitanate of Zengg, during the reign of Mathias Corvinus. The Warasdin Frontier originated in the same manner in the 16th, and the Banat Frontier in the 17th century. The constitution of the Military Frontier, as it existed till 1873, has been thus described: "The military stations along the frontier serve a threefold purpose —the defense of the country, the prevention of smuggling, and the prevention of the spread of contagious disease into the territories of the Austrian empire. The inhabitants of this crown-land enjoy peculiar privileges. Their immigrant ancestors received only the temporary use of lands consigned to them; but in 1850 a law was passed making over the land to the occupiers as their own property. This right of property does not belong, however, to individuals, but to the family in a united sense. The oldest member of a family (called the *hausvater*) is intrusted with the management of the land; his partner (the *hausmutter*) ranks equal with him, and they each receive a double share of the profits for the year as recompense for the management of the estate. A family of this sort is called a border-house (*grenzhaus*). All who are able to bear arms are sworn to the service from their 20th year. The soldier of the frontier, who is clothed as well as

armed and supplied with ammunition by government, finds it his duty not only to watch and protect the frontier, but to preserve peace and order in the interior, and to go on foreign service when required. Only the smaller portion of the forces of the Military Frontier is retained in readiness for active service, while the remainder pursue their ordinary employments. To facilitate the accomplishment of the purposes aimed at by the Military Frontier, the *cordon*, a series of guard-houses along the whole frontier, affording accommodation to from 4 to 8 men, as well as larger ones, accommodating 12 men and a junior officer, has been instituted. Within this line are the officers' posts. Without announcing himself at the posts, no one is allowed to pass the boundary; and after permission is given, the passenger must remain a longer or shorter time at the quarantine establishment, in order that all introduction of disease may be prevented.

MILITARY ORDERS, religious associations which arose from a mixture of the religious enthusiasm and the chivalrous love of arms which almost equally formed the characteristics of mediæval society. The first origin of such associations may be traced to the necessities of the Christian residents of the Holy Land, in which the monks, whose first duty had been to serve the pilgrims in the hospital at Jerusalem, were compelled, by the necessity of self-defense, to assume the character of soldiers as well as of monks. See JOHN (ST.), KNIGHTS OF. The order of the templars (q.v.) was of similar origin. Those of Alcantara and Calatrava in Spain had for their immediate object the defense of their country against the Moors. These orders, as well as that of Avis in Portugal, which was instituted with a similar view, followed the Cistercian rule, and all three differed from the templars and the knights of St. John in being permitted by their institute to marry once. The same privilege was enjoyed in the Savoyard order of knights of St. Maurice and the Flemish order of St. Hubert. On the contrary, the Teutonic knights, who had their origin in the crusades (See GRAND MASTER), were bound by an absolute vow of chastity. With the varying conditions of society, these religious associations have at various times been abolished or fallen into disuse; but most of them still subsist in the form of orders of knighthood, and in some of them attempts have recently been made to revive, with certain modifications, the monastic character which they originally possessed.

MILITARY PUNISHMENTS, those which are inflicted upon soldiers regularly enlisted, or non-commissioned or commissioned officers, for infractions of discipline or breaches of military law. Among the ancient Greeks the commander of an army was empowered, in case of sedition or mutiny, to cause the ringleaders to be seized and instantly put to death. Thus, we read in the *Iliad* that Agamemnon threatened deserters with death; and Alexander the great, when a mutiny took place partly in consequence of the jealousy excited by the favor which he showed the Persians, caused thirteen of his Macedonians to be executed without a trial. The military law of Athens prescribed the punishment of death for the crime of desertion while on service. Among the Lacedæmonians, cowards and deserters were either put to death or publicly disgraced; offenders who did not suffer the extreme penalty were made, when at home, to wear a parti-colored dress, and were obliged to submit in silence to any insult which the meanest citizen would like to offer. Disgrace was also attached to any soldier who had the misfortune to lose his shield. Said the Spartan mother to her son, "Return, my son, with your shield, or upon it." The ancient Romans punished crimes committed by the soldiery with great severity. For the gravest offenses they were beheaded or crucified; and under the Pagan emperors, some were burned alive, while others were exposed to wild beasts; but this may have been in the cases of those who professed the Christian religion. On the occurrence of a mutiny, every tenth, twentieth, or hundredth man engaged in it was selected for punishment; though sometimes only the ringleaders were chosen. Frequently, in the case of deserters or seditious persons, they were first scourged and afterwards sold into slavery; and sometimes such an offender was condemned to lose his right hand, or was bled nearly to death. If a soldier absented himself from his post when doing guard duty, he was examined by the tribune, and on the offense being proved against him was sentenced to the bastinado. Sometimes the culprit was permitted to escape, if able, while a shower of blows was being visited upon him; but in such instances he became an outcast, whom no one dare harbor. Punishments for theft, or for giving false testimony, and slight breaches of discipline, were lighter, though frequently of a similar character. Sometimes the culprit was temporarily deprived of his pay, forfeited his arms, or was degraded in rank. Again, he was sentenced to remain outside the camp, subject to the danger of being captured by the enemy; or he was made to stand in the prætorium exposed in an unmilitary dress. Or he was sentenced to a period of hard labor, reduced to an inferior rank, or dismissed the service in disgrace. Cowardice, or loss of arms, always subjected the Roman soldier to punishment. A centurion who committed a breach of discipline was condemned to surrender his emblem of authority, a vine branch. The power of life and death rested in the hands of a dictator, who could sentence to death any offender against military regulations; and the Roman consuls had the power of exercising summary jurisdiction in capital cases. Punishments were ordered by the legionary tribunes and by the prefects, with the concurrence of a council. The Roman system of punishments continued in vogue among the nations of modern Europe, so far as military offenses were con-

cerned, until a recent date. Besides the infliction of a certain number of lashes with cords, soldiers convicted of theft, marauding, or any other breach of discipline not punishable with death, were sentenced to run the gauntlet [gauntelope, or ganglope; from gang, a passage, and the root "to run," found in elope]. For the execution of this sentence the regiment was drawn up in a double line, and each man being furnished with a small stick, generally of osier (except the grenadiers, who used their belts), the culprit, naked to the waist, was either marched slowly or allowed to run as fast as he could, according to circumstances, from the head to the rear extremity between the two lines, each man striking him as he passed along. In certain cases the offender was afterwards expelled from the regiment, and sometimes also from the town or district, with a charge never to appear there again under pain of death. The punishment of the knout in the Russian army is inflicted with a leathern strap or belt, having a wooden handle, and is applied on the naked back of the offender. Cavalry soldiers were formerly frequently punished by the *picket*, as it was called; this consisted in the man being made to hang by his hands from a beam during a certain time, a stake, with its upper end made sharp, being planted in the ground under him, so that, when from weariness he could no longer keep himself up, his foot was pierced with the stake; this kind of punishment has been long abolished. Confinement without light during a certain number of hours was, and still is, a frequent punishment for being absent without leave from parade, either on account of drunkenness or from any other cause. Formerly the pillory was a punishment awarded to offenses of this nature. Besides the punishments of death and transportation, which for great crimes are within the scope of military law in the British army, breaches of discipline are visited by temporary imprisonment, extra drills, extra guards, and the performance of fatigue duties; but punishments consisting of protracted periods of confinement to barracks accompanied by laborious employments, inflicted at the discretion of commanders of regiments, have been abolished for many years, not, however, before the most serious mortality in consequence had made it absolutely necessary. While an army is in the field, breaches of discipline must be punished promptly and with more than usual severity. It might be presumed that acts of treachery will seldom be committed; desertions to the enemy do, however, occasionally take place; but the more usual crime is quitting the ranks on a lawless expedition of plunder, generally accompanied by gross acts of outrage and often murder, against the defenseless people of an invaded or occupied country. In such cases, it is generally conceded that the offenders should be, and they usually are, shot or hanged on the spot. Even when the crime is less heinous, the well-being and perhaps the safety of an army may be periled in consequence of resentment excited among the surrounding inhabitants, and punishment should be swift and condign. In the presence of an enemy there can scarcely be a more serious offense than intoxication; miscarriage of an enterprise, and defeat, with the loss of numbers of gallant men in an action, may be the fatal consequences of indulgence under such circumstances. Whatever may be the defense in other instances, there can be none in this, and the punishment is therefore always immediate and without recourse. The punishment of the lash is one that is now given up by civilized nations. Formerly, and particularly in the British army, a terrible frequency in the use of this discipline could not but tend finally to the demoralization of the men. Gen. sir Charles Napier has stated that in the beginning of this century, when flogging was common, he had frequently seen from 600 to 1000 lashes given under sentence by merely regimental courts-martial; and in those days a man who had suffered a part of his sentence was often brought from the hospital, before his wounds were entirely healed, to receive the remainder. The power of public opinion proved so strong in England, and was so manifestly opposed to flogging in the army and navy, that it gradually fell into disuse, until a regulation issued in 1866 practically abolished it. By the existing law, a man has to be convicted of one disgraceful offense before he becomes liable to flogging for the next one, and fifty lashes is the extreme penalty; see FLOGGING. In the United States this practice does not exist. Punishment by military law is confined, except in the case of the death-penalty, when engaged in war, to imprisonment, expulsion from the service, and minor penalties.

MILITARY SCHOOLS, as regards the British army, are divisible into several classes. 1. Those for the education of officers already in the service; of these there are the staff college (q.v.) and the establishment at Chatham for training engineer officers. 2. Professional schools common to officers and men will be found under GUNNERY, SCHOOL OF, and MUSKETRY, SCHOOLS OF. 3. Schools for the professional education of candidates for commissions; for these reference should be made to MILITARY ACADEMY, ROYAL, and to SANDHURST MILITARY COLLEGE. 4. The schools for men in the ranks and for their children are described under SCHOOLS, REGIMENTAL; while the instruction provided for their sons or orphans is shown under MILITARY ASYLUM, ROYAL.

The military schools of foreign countries deserve considerable attention, especially those of France, where a military commission is one of the best scholastic prizes looked forward to. In France no attempt is made to impart general education at the military seminaries; a boy is required to have a thorough general knowledge before he can be admitted to these institutions. Being open to universal competition, and being the only channel—or nearly so—to the best employment under the state, the great military

schools, by the high standard required for them, give great impetus to general education throughout the empire and the lycées, or public schools, adapt their course of instruction to the anticipated competition. In the army, two-thirds of the line commissions and one-third of those for the scientific corps are given to non-commissioned officers, but very few of these rise beyond the rank of captain; the remaining commissions in the line and scientific corps, and all appointments to the staff, are given by competition, after a careful course of professional education. The candidates in open competition are placed according to merit either in the infantry school of St. Cyr or the celebrated Polytechnique; at both colleges they have the right, if they need it, to partial or entire state support. From the school of St. Cyr the more promising pupils pass to the staff school, and thence, after a thorough course, to the état majeur of the army; the remaining students pass as subalterns into the line. The pupils of the Polytechnique, which is entered after the age of 17 years, have annually about 160 valuable prizes open to them. The first 30 to 40 candidates usually select civil employment under the state, such as the "ponts et chaussées;" those next in merit choose the artillery and engineers, and pass through a technical course at the school of application. The remaining students either fail to qualify and leave the school, or have to content themselves with commissions in the line, subordinate situations in the government, civil or colonial service, or they retire into civil life altogether.

In actual service there are schools for the men, who are also taught trades and singing. The standard of education among French soldiers is far higher than among their English brethren, as the conscription draws the men from all classes of society.

The Prussian system of military education differs from that of France in that competition is but sparingly resorted to; and the object is to give a good general and professional education to all the officers, rather than a specially excellent training to a selected few. Aspirants for commissions must enter in the ranks, and within six months pass a good examination in general and liberal knowledge; if, however, the candidate has been educated in a cadet-house—which is a semi-military school for youths—and has passed properly out of it, this examination is dispensed with. After some further service, the aspirant goes for nine months to one of three "division schools," where he completes his professional education. If he pass the standard here required, he is eligible for the next vacancy, but cannot be commissioned unless the officers of the corps are willing to accept him as a comrade. The artillery and engineer schools do for those services what the division schools do for the line. The culmination of Prussian military education is the staff school, open to competition for all the officers of the army, and presenting the highest prizes in the profession. In all the schools, the candidates study at the expense of the state, or receive great auxiliary grants.

The Austrian system is very elaborate, and commences at an early age; boys intended for military service beginning their professional almost contemporaneously with their general education. There are schools for training for non-commissioned officers and for officers, and senior departments for imparting more extended instruction to both classes. Candidates for appointment as non-commissioned officers pass by competition through the lower houses, where they remain till 11 years old; the upper houses, which detain them till 15; and the school companies, whence, after actual apprenticeship to service, a few pupils pass to the academies for aspirants for commissions, and the others are drafted into the service as non-commissioned officers. For officers, boys are pledged to the service by their parents at the age of 11, when they are placed in cadet-schools; after which the state takes charge of them. At about 16 the boys pass, according to qualification, to the line or scientific-corps academies, and four years later into those services themselves. The young officer's chance of entering the staff school—and therefore the staff—depends upon his place at the final academic examination. The competition observed throughout the course of military education is said to impart great vigor to the tuition.

In the Italian army the system so nearly approaches that of France that a separate description is unnecessary. It need only be stated that the educational status of the Italian officers is considered high.

MILITARY SECRETARY, an officer on the personal staff of generals in high command. His duties are to conduct the correspondence of his chief, and to transact a great amount of confidential business which would dangerously occupy the time of the general himself. The military secretary to the officer commanding-in-chief at the war office receives £1500 per annum, and is usually a general officer. The military secretary to a commander-in-chief in the field is for the most part below that rank, and receives only the staff pay of £346 15s.; while to a general commanding a division only, an *assistant military secretary*, at £173 7s. 6d. per annum, is allowed. This staff pay is of course additional to the officer's regimental or unattached pay.

MILITARY TRAIN, formerly a highly important corps of the army, of which the function was to transport the provisions, ammunition, and all other matériel, together with the wounded in time of battle. It was formed after the Crimean war, on the dissolution of the land-transport corps (q.v.). It comprised six battalions, in all 1840 officers and men, and its annual cost for pay, etc., was about £71,000. The corps ranked after the royal engineers, and was classed as mounted infantry, the officers receiving

infantry rates and the men cavalry rates of pay. The commissions were purchasable, as in the line. The men were armed with carbine and sword, but rather for defensive than aggressive purposes. Attached to each battalion were 166 horses, with proportionate wagons and ambulances.

It is proper to observe that the military train constituted only the nucleus of a transport service for a large army, and that in time of war it would be expanded by the addition of thousands of horses or mules and the incorporation of many hundred drivers, etc. The advantage of possessing even a few men ready trained and capable of directing the movements of others was amply demonstrated by the failures of the Crimea in 1854 to 1856; so that parliament voted ungrudgingly the expense of this corps, although in time of peace it was comparatively without employment. The military train was disbanded in 1870, as being too military in its formation. Its functions were transferred to the transport section of the army service corps, a purely non-combatant organization.

MILITEL'LO, a city of Sicily, in the province of Catania, and 21 m. s.w. of the town of that name. Pop. '72, 9,978. It stands on a mountain in a somewhat unhealthy situation. In its vicinity there are important salt-lagoons.

MILITIA (Lat. *miles,* a soldier) has now the acquired meaning of the domestic force for the defense of a nation, as distinguished from the regular army, which can be employed at home or abroad in either aggressive or defensive operations. Every nation has a reserve, under its law military, upon which its defense would fall, on the discomfiture of the regular army; but the system differs in each country, and, with the exception perhaps of the United States during peace, none are formed on the model of the British militia.

The militia is a constitutional force raised under the sanction of parliament, in which the people—in theory, at least—wage their own bodies for the defense of their own soil, and in which they depute the sole leadership and command to the sovereign and the crown nominees. Organized by counties and cities, it is essentially a local force: the selection of candidates for first commissions by the lord-lieut. of the county connects it with the land, while the command of the sovereign effectually combines in it the interests of the three estates. Under the Anglo-Saxons all men were required to bear arms, as a sort of body-rent for the land they held; but no special organization being adopted, efficiency was rarely attained in the use of arms. This the nation found to its cost when the Danes overran it during Alfred's reign. That great king, to prevent a similar occurrence, established the militia or *fyrd,* making land the basis of numbers, but the family system that of discipline: so many families were a tything, ten tythings a hundred, and hundreds were united into county powers, each under its *heretoch,* dux, or duke. Each section of the community had not only to furnish its quota in time of war, but also to provide arms, keep them in repair, and to undergo so many days' training every year. This arrangement subsisted in more or less vigor until the conquest; then the feudal troops at first rendered the militia unnecessary; but it never ceased wholly to exist. When the crown began to contend with the Norman barons, it naturally found its most powerful instrument in reviving the Saxon militia, and the English yeomanry became thenceforth the fear of England's enemies, and a guarantee for the gradual enfranchisement of the people. Henry II. established "an assize of arms," at which every holder of land was bound to produce one or more men fully equipped, and capable of fighting in the national defense. The arms were annually inspected, and it was illegal to sell, lend, or pawn them. This annual assembly of the fyrd or militia is first recorded after the conquest in 1181; by the statute of Winchester in 1285 Edward I. revised the scale of arms for the several ranks. Further alterations to suit the advances in the art of war took place in 1558 (4 and 5 Ph. and M. c. 2). In 1604 James I. (1 Jac. c. 25) abolished the fyrd, and substituted "trained (commonly called train) bands," to the number of 160,000 men —a force partaking of the nature of militia and volunteers, but deficient in discipline and drill. During the civil war of Charles I. the train bands or militia mostly sided readily with the parliament. Up to this time the command had never by any law been definitely assigned to the crown or to any other body. After the restoration, the loyal parliament of Charles II. immediately reorganized the militia—essentially on its present footing—and declared as law that "the sole supreme government, command, and disposition of the militia is, and by the laws of England ever was, the undoubted right of his majesty and his royal predecessors." As, however, the crown from this time began to depend for its support upon a mercenary army, and as the local status of the militia officers must always render the militia a force dependent on parliamentary influence and ties, the militia was much neglected until 1757, when a large portion of the regular army being absent in the seven years' war, it was carefully organized for the defense of the kingdom. Several militia acts have been subsequently passed, but rather with a view to consolidating the militia laws of England, Scotland, and Ireland, and to effect minor changes necessary for the growth of the institution, than to remodel in any essential degree the constitution of the force. The acts under which the militia is now organized are the 42 Geo. III. c. 90 and 91; 49 Geo. III. c. 120; 15 and 16 Vict. c. 50; 17 and 18 Vict. c. 13, 105 and 106; 18 and 19 Vict. c. 57, 100, and 106; and 38 and 39 Vict. c. 69, consolidating previous acts. The present law stands thus: The sovereign appoints lords-lieut. of counties, who nominate to *first* commissions in their county regi-

ments. The general commanding in the military district commands the militia force through the colonels of the sub-districts in which the regiments respectively are.

The force to be provided by each county—known as its "quota"—is fixed by government in proportion to the population, etc. The numbers must be provided in some way. In practice they are raised by voluntary recruitment; but should volunteering fail, a levy by ballot would be made upon all the inhabitants of the locality between the ages of 18 and 35. The power of making this ballot always exists, and would have by law to be enforced but for the militia ballot suspension act, which, when the measure is unnecessary, is passed from year to year. Many classes are exempt from the ballot, as peers, soldiers, volunteers, yeomanry, resident members of universities, clergymen, parish schoolmasters, articled clerks, apprentices, seafaring men, crown employees, free watermen of the Thames; in England any poor man with more than one child born in wedlock; in Scotland any man with more than two lawful children, and not possessed of property to the value of £50; in Ireland any poor man not worth £10, or who does not pay £5 per annum for rent, and has more than three lawful children under the age of 14.

The militia are bound, when called upon by the crown, to assemble annually for any period not exceeding three months, for training purposes; and the government can embody the whole or part of the force at any national crisis. The regiments were embodied almost without exception during the Russian war of 1854–56, and to a considerable extent at the time of the Indian mutiny, 1857–59. The quota of the United Kingdom is 200,000 men, but not above two-thirds of that number can be considered as effective. They may not be sent out of the kingdom, except they volunteer, and then only by special permission of parliament. As a defensive or garrison force, setting free the regular army for aggressive operations, the militia is a most valuable institution; and in times of war it has ever been found an admirable training-school whence soldiers volunteer into the permanent forces.

A militia volunteer receives bounty, payable partly on joining and partly in installments after each training period. When out for training, or embodied for permanent duty, the officers and men receive the same pay as regular troops of corresponding arms of the service, and are under the mutiny act and articles of war, except that no punishment can extend to life or limb. The officers rank with, but junior to, their brethren of the regular army; the great distinction in appearance between regular and militia troops being that in the former the appointments are all of gold-lace, and in the latter of silver; the buttons being similarly distinguished. The force is divided into heavy, light, rifles, and Highland infantry, and into artillery, the latter being generally limited to coast counties, and being very highly esteemed by the authorities.

The celebrated local militia was instituted in England and Scotland in 1808, and suspended in 1816. It consisted of a force for each county six times as numerous as the proper militia quota, comprising, of course, many classes, which, from age or other circumstances, were ineligible for the militia. These troops could only be marched beyond their respective counties in the event of actual invasion. Their numbers reached, in 1811, to 213,000 men.

The cost of the militia for the year 1879–80 amounted to £1,239,650, the number of officers and men provided for being 137,556 (including permanent staff and militia reserve). As a constitutional precaution, the estimates were formerly prepared—at least nominally—by a committee of the house of commons; but as the check was of no real advantage, it was abolished by a resolution of the house in 1863, and thenceforward the minister of war includes the charge among the many services provided for in his department.

MILITIA (*ante*). The militia system of the United States arose from that jealousy of standing armies which has always characterized the Anglo-Saxon peoples. After the revolutionary war congress determined to limit the regular army to the actual requirements of immediate necessity, and supplement it by a state militia. The president is commander-in-chief of the militia of the several states, when called into the actual service of the United States. He has the power to call out these forces, by orders to any officers of the militia he may address, in case of invasion or rebellion against the authority of the United States. The militia may be required to serve for a period not exceeding nine months. The troops receive during this time the pay and rations of soldiers of the regular army, and the officers rank next after officers of the same grade in the regular service. The majority of the state constitutions require the passage of laws for the organization and equipment of their militia. The governor is the commander-in-chief, and subject to his orders are the necessary officers, chosen by various methods in the different states. It was customary for many years to have annual drill days for all the state troops, who were compelled to attend under penalty, but the laws providing for them have been repealed or fallen into disuse. Voluntary organizations are now formed, which select their own uniforms and the branch of the service they desire to be attached to. They receive small state bounties to perfect their drill and keep themselves in good condition for an emergency. These organizations form only a small part of the whole militia, but quite sufficient for the government in time of peace. The actual militia of the United States consists of these volunteer troops and all other

able-bodied male citizens of the age of 18 and under 45, with the exceptions provided by national and state laws, all of whom are subject to be summoned to perform military duty according to the laws of congress or of their respective states.

The state militia was often called out during the revolution, and the "whisky insurrection" of 1794 was put down by the militia of Pennsylvania, New Jersey, Maryland, and Virginia. During the war of 1812 disputes arose between the national and state authorities regarding the right of the president to determine whether the emergency had arisen which authorized his calling them out, the right to place them under officers of the president's appointment, and the right to march them beyond the limits of the state. The courts decided in favor of the president, and his right to decide whether the militia shall be summoned, and his right to place them under the command of a federal officer ranking their own officers is no longer disputed. During the civil war, the first call of the president for 75,000 men was principally filled by the militia, and the total number of volunteers, drafted men, and militia troops during the whole war was 2,690,401. There were 1,000,516 men in the field at the proclamation of peace, and of these soldiers about 978,000 were volunteers or drafted men.

MILK is an opaque white fluid secreted by the mammary glands of the females of the class *Mammalia*, after they have brought forth their young, and during the period in which their offspring are too immature to live upon ordinary food. It is devoid of odor, except for a short time after its extraction; is of a slightly sweet taste, most commonly of a slightly alkaline reaction (except in the *Carnivora*, in which it is acid); and its average specific gravity (in the case of human milk) is 1032.

When milk has been allowed to stand for some time, a thick, fatty, yellowish-white stratum (the cream) forms upon its surface. When this is removed, the fluid below (popularly known as "skim-milk") is found to be of greater specific gravity, and of a more bluish-white tint. Milk does not coagulate on boiling, but a membrane or film of coagulated caseine, containing fat corpuscles, forms upon its surface. If milk be allowed to stand for some days exposed to air at the ordinary temperature, it gradually begins to exhibit an increasing acid reaction, from the formation of lactic acid from the milk-sugar; while the caseine becoming coagulated by the action of the lactic acid, is separated in the form of "curds," and the fluid gradually assumes the form of a thickish pulp. The ordinary means of obtaining the caseine (which exists in solution in the milk) in the form of curds is by the addition of a piece of rennet (the dried stomach of the calf), which acts as powerfully as any acid. The curds thus separated form the basis of cheese, while the fluid portion left after their removal is known as the 'whey."

When examined under the microscope, the milk appears as a clear fluid, containing fat globules (the milk globules, as they are usually called) in suspension. They commonly vary from .0012 to .0018 of a line in diameter. They are each invested with a delicate coat of caseine, which prevents their running together. By *churning*, the surrounding envelopes become ruptured, and the contents are made to unite, forming *butter*. In addition to milk globules, colostrum globules (see COLOSTRUM), which are irregular conglomerations of very small fat globules, occur in the milk for the first three or four days after delivery.

The following table, which is based on the researches of Vernois and Becquerel, represents the density and composition of 1000 parts of milk in various animals:

	Density.	Water.	Solid Constituents.	Caseine and Extractive Matters.	Sugar.	Fat (Butter).	Salts.
Woman	1032.67	889.08	110.92	39.24	43.64	26.66	1 38
Cow	1033.38	864.06	135.94	55.19	38.03	36.12	6.64
Mare	1033.74	904.30	95.70	33.35	32.76	24.36	5.23
Ass	1034.57	890.12	109.88	35.65	50.46	18.53	5 24
Goat	1033.53	844.90	155.10	35.14	36.91	56.87	6.18
Ewe	1040.98	832.32	167.68	69.78	39.43	51.31	7.16
Bitch	1041.62	772.08	227.92	116.88	15.29	87.95	7.80

The actual caseine which in the preceding analyses is associated with the undefined group of substances termed *extractive matters*, ranges from 27 to 35 in 1000 parts of healthy human milk, while in the colostrum it amounts to 40; in the milk of the cow it is somewhat higher; while in that of the bitch, and probably of all carnivorous animals, it is more than trebled. It is found in the case of women that the quantity of the caseine increases with the free use of animal food, and diminishes upon vegetable diet.

The fatty matters range from 25 to 43 in 1000 parts of women's milk, while in cows' milk they average, according to Lehmann, 45; and in bitches' milk, rise to 110. These fatty matters, which collectively form butter, consist of an admixture of 68 per cent of margarine, 30 per cent of oleine, and 2 per cent of an admixture of fats, which, on saponification, yield butyric, caproic, caprylic, and capric acids. The milk which is last yielded is much richer in fat than that which is first drawn.

The sugar, or lactine, whose properties are described in the article SUGAR OF MILK, varies in human milk from 32 to 62 in 1000 parts, and in cows' milk from 34 to 43. The milk of bitches, when fed on a purely animal diet, often contains no traces of sugar; but if they are fed on vegetable or mixed food, a considerable quantity of sugar is found. The salts in women's milk range from 0.6 to 2.5 in 1000 parts, and in cows' milk from 3.5 to 8.5. That a peculiar selective power is exerted by the mammary gland, is shown by the following table, which shows the comparative analyses of the ashes of cows' milk and of cows' blood, each reckoned for 100 parts:

	Ash of Milk.	Ash of Blood.
Chloride of potassium	14.18	none
Chloride of sodium	4.74	38.82
Potash	23.46	11.44
Soda	6.96	29.09
Phosphoric acid	28.40	7.74
Lime	17.34	1.90
Magnesia	2.20	0.75

Why the potassium and sodium compounds stand in this inverse relation to one another in these two fluids, is not accurately known. The abundant supply of phosphoric acid, lime, and magnesia in the milk is doubtless for the purpose of building up the infant skeleton.

The milk is liable to tolerably regular changes at different periods of lactation; for example, the sugar is deficient during the first month, and is in excess from the eighth to the tenth month; the caseine is in excess during the first two months, and is most deficient between the tenth and eleventh month; the butter is considerably in excess during the first month, and slightly so for the next two months; while the salts are most abundant during the first month, but present no regular law of decrease. Hence, it will readily be seen that in the selection of a wet-nurse, one of the leading requirements should be that her milk should be of the same age as that of the mother's. Various medicines, as, for example, iodide of potassium, iodide of mercury, and quinine, have been detected in the milk, after being taken by the mother; and many cases are on record in which strong mental impressions, as fear or anger, acting on the mother, have so far poisoned the milk as to cause immediate convulsions in the infant.

The daily quantity of milk is dependent upon various conditions, such as bodily constitution, food, etc. Lampérierre determined the quantity of milk secreted in definite times by a large number of women, and found as a mean for each breast between 50 and 60 grammes (the gramme being 15.4 grains) in the course of two hours, assuming that the secretion continues at a uniform rate.

In those cases in which a wet-nurse cannot be obtained, it is expedient to modify cows' milk, so as to make it resemble that of women. The main differences are, that the former contains more caseine and less sugar and water than the latter. By exposing cows' milk to a gentle heat in a wide open vessel, we obtain a film of caseine which may be removed (more than once, if necessary); on then adding sugar (sugar of milk, if procurable) and water, we obtain a good imitation of the human secretion.

In the article on DIGESTION, the uses of the leading ingredients of the milk in relation to nutrition are sufficiently noticed. The milk of cows is extensively used as an article of diet both for healthy persons and invalids, and it enters largely into all hospital, prison, and workhouse dietaries. In patients with a tendency to consumption, or in whom that disease has already manifested itself in its early form, cream is often of great service, especially when the stomach cannot bear cod-liver oil.

The adulterations to which milk is often subjected are noticed in the article FOOD, and the instruments used for testing the purity of this fluid are briefly referred to in the article GALACTOMETER. Water is by far the commonest adulteration, and if it has been added in large quantity, the fraud may be detected by evaporating a small weighed quantity of the milk (say 500 grains) to dryness, and ascertaining whether the due proportion of solid constituents is left.

Various methods have been proposed for the preservation of milk for sea voyages, etc. Moore's essence of milk is prepared by the addition of a little sugar and the evaporation of the fluid at a temperature of 110°, to one-fourth of its bulk, when it is put in small tin cases, soldered down, steeped in boiling water for a time, and taken out to cool. This preparation keeps good for a long time. Blatchford's solidified milk is prepared by mixing 112 lbs. of milk with 28 lbs of white sugar and a little bicarbonate of soda. The mixture is evaporated under certain conditions till it assumes the form of a creamy powder, which is cooled, weighed into parcels of 1 lb. each, and compressed into brick-shaped masses, which must be triturated and mixed with warm water when required for use. Grimwade's desiccated milk is prepared by mixing the fluid with a little sugar and alkali, and evaporating it till it is as thick as dough; it is then dried, crushed, and bottled. At the meeting of the British association in 1859, the abbé Moigno described four methods employed in France for the preservation of milk, of which the most valuable seemed those of Maber and De Pierre. For details regarding these methods, we must refer to the abbé's paper. He found milk prepared by Maber's process perfectly good after having been kept between five and six years. The milk pre-

pared by De Pierre's process, unlike the other preparation, is liquid. A specimen of it, the age of which was not stated, which the abbé brought to Aberdeen, was found to be perfectly fresh. The preparation of condensed milk is now conducted on a large scale in Switzerland.

MILK-FEVER, in the lower animals, comes on within a few days after puritiontar. One variety common to most animals consists in inflammation of the membranes of the womb and bowels, and is produced by exposure to cold, overdriving, or injury during labor; it is best treated by oil and laudanum, tincture of aconite, and hot fomentations to the belly. The other variety, almost peculiar to the cow, attacks animals in high condition, that are good milkers, and have already borne several calves; it consists in congestion and inflammation of the brain and large nervous centers, and impairs all the vital functions, leading to dullness, loss of sensation and motion, and stupor. Blood must be drawn early, whilst the cow is still standing and sensible. Later, it only hastens death. A large dose of physic, such as a pound each of salts and treacle, a dram of calomel, an ounce of gamboge, and 2 ounces of ginger, should at once be given, solid food withheld, clysters of soap, salt, and water thrown up every hour, cloths wrung out of boiling water applied along the spine, the teats drawn several times daily, and the animal frequently turned. Although treatment is uncertain, prevention is easily insured by milking the cow regularly for 10 days before calving, feeding sparingly on laxative unstimulating food, giving several doses of physic before, and one immediately after calving, and when the animal is in very high condition and prone to milk-fever, bleeding her a day or two before calving.

MILK-FEVER (*ante*), the fever which accompanies or precedes the secretion of milk in women recently delivered. The most common time of its appearance is about the third day after parturition, the symptoms being a quick pulse, increased heat, redness of the face, a diminution or temporary suspension of the lochial discharge, and swelling of the breasts, with a feeling of tension and oppression. There is a tendency to this condition in all women, and perhaps it may be regarded as a normal one, as it is difficult to suppose that so important a phenomenon as the establishment of the secretion of milk could take place without a certain degree of constitutional disturbance, and without there being any real pathological state of any of the organs. There are women, however, who suffer but little constitutional disturbance, comparatively. Those who suffer the most, among healthy women, are the plethoric and robust, and those whose minds are much occupied. Those who are subjects of chronic diseases will be affected in various ways, and no rules of prognosis can be relied on. The natural tendency is for the symptoms to pass away without any special treatment, but a judicious diet of bland articles, with the administration, when indicated, of salines and mild laxatives should not be disregarded.

MILK LEG. See PHLEGMASIA ALBA DOLENS, *ante*.

MILK, SUGAR OF, or LACTINE. See SUGAR (MILK SUGAR), *ante*.

MILK TREE. See ARTOCARPACEÆ; COW TREE, *ante*.

MILK VETCH. See ASTRAGALUS.

MILKWEED. See ASELEPIADACEÆ; ASELEPIAS; *ante*.

MILKWORT. See POLYGALA.

MILKY-WAY. See GALAXY.

MILL. This word is now used in a general way as a name for almost all kinds of manufactories, as well as for grinding-machinery; but we shall only describe here the arrangements of an ordinary flour-mill, adding a brief notice of the edge-mill in use for grinding oil-seeds and some other substances.

From time immemorial corn has been ground by a pair of stones. The earliest and rudest handmills were no doubt somewhat like one sent home by Dr. Livingstone, the African traveler, from the banks of the Shire in South Africa. He describes it as "a mill such as Sarah used, when told by her lord to do the thing handsomely and in a hurry for the strangers—i. e., a big stone worn hollow by the operations of grinding. The upper stone is grasped by both hands, and the weight of the body brought down on it as it is shoved to the lower part. . . . . The meal is made very fine." The next step in advance of this was the quern or handmill still in use in the Shetland isles, the Faröes, and other places. The old quern scarcely differs from a pair of modern millstones, except in the stones being small enough to allow of the upper one being turned by the hand instead of by wind, water, or steam power.

The millstones which are now all but universally used for grinding corn are made from buhr-stone, a form of silica like flint in hardness, but not so brittle. This rock is only found in abundance in the mineral basin of Paris and some adjoining districts, and belongs to the tertiary formation. It is of a cellular texture, and is frequently full of silicified shells and other fossils. Millstones are usually from 4 to 6 ft. in diameter, and are each made up of a number of pieces strongly cemented and bound together with iron hoops. One 6 ft. in diameter, of fine quality, will cost about £50. The grinding surface of each stone is furrowed or grooved, the grooves being cut perpendicularly on the one side, and with a slope on the other. A pair of stones are used together, and

both being furrowed exactly alike, the sharp edges of the grooves on the one come against those on the other, and so cut the grain to pieces.

Fig. 1 shows a section of a flour-mill reduced to its simplest elements. The millstones are at *a*, the lower of which is firmly fixed, it being a matter of importance to have this done securely; and the upper is made to revolve, on a shaft which passes up through the lower one, at a speed of one hundred revolutions per minute, more or less. Motion is communicated by the spur-wheel *b*, which is driven by a water-wheel or other power. The corn, previously cleaned, is supplied to the millstones by means of the hopper *c*, connected with which there is a valve, *d*, for regulating the supply. Passing through a hole in the center of the upper millstone, it comes in between the two, where it is ground, and thrown out on all sides by means of the centrifugal force. The millstones are, of course, inclosed, and the flour passes down through the spout *e*, to the worm at *f*, which, while it cools the ground corn, carries it along to elevators *g*. These raise it up to the floor on which the silk dressing-machine, *h*, is placed. This is a cylinder, which was formerly made of wire-cloth of various degrees of fineness, and consequently separated the flour into different qualities—the finest passing through the first portion, the second passing throught the next, and so on; but no part of it large enough in the openings to let through the bran, which passed out at the end. Silk is now preferred to wire-cloth for dressing the flour. Hoppers, *i*, are placed below the dressing-machine, by means of which the flour and bran are filled into sacks; No. 1 being fine flour; No. 2, seconds; and No. 3, bran.

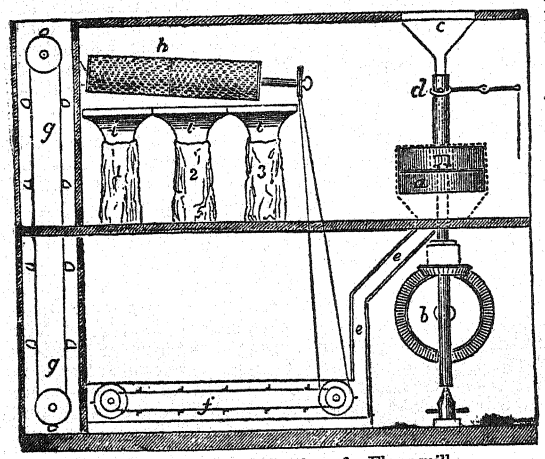


Fig. 1.—Elementary Section of a Flour-mill.

One of the largest flour-mills in Great Britain is the one belonging to Messrs. Tod at Leith. It is about 150 feet long, 50 feet broad, and 65 feet high. At one end of it is placed a steam-engine of 350 horse-power, which works all the machinery of the mill. This communicates motion to a series of shafts and wheels occupying the ground-floor, belts being used as much as possible for driving the wheels instead of spur gear, so as to avoid a shaking motion. On the second floor are placed 36 pairs of millstones, arranged in two lines along the room, the wheat being supplied silently to them by centrifugal feeders. On the third floor are situated the hoppers for feeding the millstones. The fourth floor contains iron rollers for partially crushing the wheat before being supplied to the millstones. This floor also contains silk and wire dressing-machines. On the fifth floor are placed the first silk dressing-machine, and also smut-machines for cleaning the wheat previous to grinding, which are somewhat similar to thrashing-machines. The sixth and highest floor also contains smut-machines. All these machines are connected in the most skillful manner by means of elevators ascending through all the floors; and along each, where necessary, there runs, in a horizontal direction, an archimedean screw, so that the grain or the flour can be conveyed to any of the machines without the assistance of hand-labor.

This mill converts wheat into flour at the rate of about 500 sacks a day of 24 hours—a quantity nearly sufficient to supply bread for the entire population of a city like Edinburgh. [The above description applies to Messrs. Tod's mill as it stood in 1863. It was subsequently greatly extended; and, after being destroyed by fire in 1874, has been completely refitted.] The great government mill of St. Maur is the most remarkable mill in France.

There is a form of mill in use for some purposes where the millstones are vertical, and called the edge-stone mill. It is sometimes, though rarely, used for grinding corn; but is much employed for crushing oil-seeds and for grinding dye-stuffs, sugar, chemicals, and a multitude of other substances. The stones are generally of some hard rock, such as granite or sandstone, and from 5 to 7 feet in diameter. For such purposes as grinding clay or loam they are usually made of cast iron, and of a smaller size. The stones revolve in opposite directions, sometimes upon a fixed stone or metal bed, and at other times it is the bed-plate itself which revolves, and in so doing turns the edge stones which rest upon it.

Among the recent improvements in our flour-mills which have attracted considerable attention are: 1. The patent process of dressing the grinding surface of the millstones by means of a peculiar kind of diamond, which rapidly covers it with fine grooves. This is still, however, more largely, and perhaps more efficiently, done by the slower process with

the nidging hammer; 2. The keeping down of the temperature of the millstones by means of a current of cold air; and 3. The introduction of Carr's patent disintegrater, which grinds wheat and other substances by means of two vertical iron disks about five feet in diameter, and a few inches apart, in each of which are several concentric rows of steel pegs, so arranged that those on the one disk overlap without touching those on the other. The disks are made to revolve rapidly in opposite directions, so as to grind the wheat by percussion.

MILL, in law. The owner of a mill situated on the bank of a stream is entitled to have the use of the stream undiminished in volume; and if the other riparian owners above interfere with the stream by diminishing its volume, thereby causing injury to the mill, the mill-owner has a right of action against the party so acting.

MILL, JAMES, was the son of a small farmer, and was b. in the neighborhood of Montrose, Scotland, April 6, 1773. He studied, with a view to the church, at the university of Edinburgh, where he distinguished himself in Greek and in moral and metaphysical philosophy. He was licensed to preach in 1798; but instead of following out the ministry, he went to London in 1800, where he settled as a literary man. He became editor of the *Literary Journal*, which after a time was discontinued; and wrote for various periodicals, including the *Eclectic* and the *Edinburgh Review*. In 1806 he commenced his *History of British India*, which he carried on along with other literary work, and published in the winter of 1817–18. The impression produced by this masterly history on the Indian authorities was such that, in 1819, the court of directors of the company appointed him to the high post of assistant-examiner of Indian correspondence, notwithstanding the then unpopularity of his well-known radical opinions. The business assigned to his care was the revenue department, which he continued to superintend till four years before his death, when he was appointed head of the examiner's office, where he had the control of all the departments of Indian administration—political, judicial, and financial—managed by the secret committee of the court of directors. Shortly after his appointment to the India House he contributed the articles on government, education, jurisprudence, law of nations, liberty of the press, colonies, and prison discipline to the *Encyclopædia Britannica*. These essays were reprinted in a separate form, and became widely known. The powers of analysis, of clear statement, and of the thorough-going application of principles, exhibited in these articles had probably never before been brought to bear on that class of subjects. In 1821–22 he published his *Elements of Political Economy*, a work prepared primarily with a view to the education of his eldest son, John Stuart Mill. In 1829 his *Analysis of the Human Mind*, appeared. His last published book was the *Fragment on Mackintosh*, brought out in 1835. He was also a contributor to the *Westminster Review* and to the *London Review*, which merged in the *London and Westminster*.

Not long after he settled in London he made the acquaintance of Jeremy Bentham, and for a number of years lived during the summer in Bentham's country-house. Although he must have derived much benefit from his intercourse with the great law-reformer, he was not a mere disciple of Bentham, but a man of profound and original thought, as well as of great reading, in all the departments of moral, mental, and political philosophy. His conversation was impressive to a remarkable degree, and he gave a powerful intellectual stimulus to a number of young men, some of whom (including his own son and Mr. Grote, the historian of Greece) have since risen to eminence. He took a leading part in the founding of University college, London. He died at Kensington, June 23, 1836. See Autobiography of J. S. Mill, and an interesting Biography by prof. Bain in *Mind*, 1876–78.

MILL, JOHN, 1645–1707; b. Shapp, Westmoreland, Eng.; graduated at Queen's college, Oxford, in 1669; was soon after elected a fellow and became eminent as a tutor; entered the ministry, and became distinguished as a preacher; became rector in 1681 of Blechington, Oxfordshire; was made chaplain to Charles II., and received the degree of D.D., the same year. In 1685 he was made principal of St. Edmund's hall; in 1704, by queen Anne, prebendary of Canterbury. The work for which he is the most distinguished is his new edition of the Greek Testament, on which he spent 30 years, finishing it only 14 days before his death. It was undertaken at the advice and expense of Dr. Fell, bishop of Oxford, but after the bishop's death Mill continued it at his own expense, and repaid to the executors what he had received. It was published the year that he died. The text which Mill adopts is that of Robert Stephens of 1550, and contains 30,000 various readings collected from manuscripts, commentaries, writings of the fathers, etc. Dr. Whitby attacked the work in his *Examen variantum lectionum Joh. Millii;* but Dr. Bentley approved the labors of Mill, and Michaelis, Marsh, and other critical scholars acknowledged the value of the edition. It was taken up for a different purpose by Antony Collins in his discourse on *Free Thinking*, in which he contends that "these numerous variations destroy the authority of the New Testament," a book which was ably answered by Whiston and Bentley who show that the variety of readings is only the necessary result of the number and variety of manuscripts. Mill's text has long been held in high esteem by scholars.

MILL, JOHN STUART, was b. in London May 20, 1806. He was educated at home by his father. In 1820 he went to France, where he lived for upwards of a year, making

himself master of the French language, and occasionally attending public lectures on science. He lived for some time at Paris, in the house of the French economist Jean Baptiste Say, where he made the acquaintance of many men distinguished, then or afterwards, in letters and in politics. He spent part of his time in the s. of France, in the house of sir Samuel Bentham, brother to Jeremy Bentham. During this stay in France he laid the foundation of his great familiarity with, and interest in, the politics as well as the literature of the French nation. In 1823 he entered the India House, and became a clerk in the examiner's office, where his father was assistant examiner. For thirty-three years he continued to be occupied in the department of the office named the political, or the transactions of the company with the native states. In 1831 he was appointed assistant examiner, and in 1856 he was placed at the head of the department. He energetically opposed the transfer of the India government to the crown in 1858. On the score of failing health he declined a seat at the new Indian council, and retired from office in October of the same year, on a compensating allowance. At the general election of 1865 Mill was returned to parliament for Westminster; and till he lost his seat at the election of 1868 he acted with the advanced liberals. He died May 8, 1873, at Avignon, where he had spent most part of the last years of his life.

Mr. Mill became an author at a very early age, and may be looked upon as one of the foremost thinkers of his time. His first publications consisted of articles in the *Westminster Review*. He took an active part in the political discussions that followed the revolution of 1830 in France and the reform-bill movement in England; and from 1835 to 1840 was editor, and along with sir W. Molesworth proprietor, of the *London and Westminster Review*, where many articles of his own appeared. In 1843 he published his *System of Logic;* in 1844, *Essays on some Unsettled Questions of Political Economy;* in 1848, *Principles of Political Economy;* in 1859, an essay on *Liberty;* in 1860, *Discussions and Dissertations;* in 1863, a small work on *Utilitarianism;* in 1865, *Comte and Positivism* and the *Examination of Sir William Hamilton's Philosophy;* in 1867 (when Mill was rector of St. Andrew's university), his *Inaugural Address;* in 1868, *England and Ireland;* and in 1869, *The Subjection of Women*. After his death apppeared his *Autobiography* (1873), read with intense interest; *Three Essays on Religion* (1874); and a second volume of *Discussions and Dissertations* (1875).

MILLAIS, JOHN EVERETT, R.A., a celebrated English painter, was b. at Southampton in 1829, entered the royal academy at the age of eleven, and in 1847 carried off the gold medal for his picture of "The Tribes of Benjamin seizing the Daughters of Shiloh," exhibited, in the following year, at the British institution. Before this period he had acquired a considerable reputation among younger painters by his avowed antipathy to the principles of art which then prevailed. His views were shared in by other students, such as Holman Hunt (q.v.), Dante Rossetti (q.v.), and Charles Collins, and a sort of artistic fraternity was formed, which obtained the name of the *Pre-Raphaelite School*. Millais's principal paintings are: "Our Savior" (1850); "Mariana in the Moated Grange" (1851); "The Huguenot" and "Ophelia" (1852); "The Order of Release" and "The Proscribed Royalist" (1853); "The Rescue" (1855); "Autumn Leaves" (1856); "The Heretic" (1858); "Spring Flowers" (1860); "The Black Brunswicker" (1861); "My First Sermon" (1863); "My Second Sermon" (1864); "Joan of Arc" (1865); "Sleeping," "Waking," "Jephtha" (1867); "Moses" (1871); "Chill October" (1871); "Day Dreams" (1874); "Sound of Many Waters" (1877), etc. Whatever opinions may be held of Millais as an *artist*, no respectable critic denies the subtlety of his imagination and depth of sentiment. He is profoundly poetical, and has probably never been surpassed in representing intense feeling and thought by means of color and composition; but his perverse affectation and contempt for "conventionalism" have marred his finest productions.

MILLARD, a co. in w. central Utah, bordering on Nevada. It is drained by the Sevier river, flowing into the lake of the same name, which is found in the central part of the co., and which has no visible outlet; pop. '70, 2,753—1,974 of American birth. Though of large area—160 m. in length and 65 m. wide—the greater part of the surface is either mountainous or a barren desert. Some small sections are fertile, and here Indian corn and wheat are raised. Chief town, Fillmore City.

MILLARD, DAVID, 1794–1873; b. N. Y.; was the son of a revolutionary officer, and spent his early life in farming. His education was entirely self-acquired. He studied theology, and in 1818 became pastor of a church in West Bloomfield, N. Y., where he remained until 1832. He then edited the *Gospel Luminary*, a religious monthly, and in 1837 settled in Portsmouth, N. H. He occupied for several years the professorship of biblical antiquities and sacred geography in the Unitarian theological school at Meadville, Penn.; and published *The True Messiah in Scripture Light* and *Travels in Egypt, Arabia, Petræa, and the Holy Land*. His life was published in 1874 by his son, Rev. D. E. Millard.

MILLAU, or MILLAUD. See MILHAU, *ante*.

MILLBURY, a t. in Worcester co., Mass., 6 m. s. of Worcester, 37 m. n.w. of Providence, on the Blackstone river, the Providence and Worcester, and the Millbury branch of the Boston and Albany railroads; pop. '70, 4,529. The chief business is the manufac

ture of cottons and woolens. There are also boot and shoe, whip, carriage, stocking, and cutlery factories, and machine-shops.

MILLEDGE, JOHN, 1757–1818; b. Ga.; was an active supporter of the revolutionary cause, being one of Habersham's party which made a prisoner of gov. Wright of Georgia—the first act of open revolt in that state. At the capture of Savannah, Milledge escaped and was present at its siege by the colonial forces under gen. Lincoln. In many other scenes of the revolution he played a prominent and gallant part, but before the close of the war was asked to take the position of attorney-general, which he did in 1780. He served nine times as the representative of Georgia in congress; from 1802 to 1804 was governor of the state, and filled a short term as U. S. senator, 1806–9. The town of Milledgeville, in Baldwin county, formerly the capital of the state, was named after him. To the establishment of the state university and its seat, Athens, he contributed liberally, and was in fact the founder of both town and college.

MILLEDGEVILLE, the former capital of Georgia, U. S., on the w. bank of the Oconee river, 150 m. n.w. of Savannah, in a rich cotton country. Among its edifices are the former governor's residence and state buildings, and several churches. Pop. '70, 2,750.

MIL'LEDOLER, PHILIP, D.D., 1775–1852; b. Rhinebeck, N. Y. His father emigrated from Bern, Switzerland, to America about 1751. Philip graduated in 1793 at Columbia college; studied theology, and was licensed to preach at the age of nineteen; became pastor of the German Reformed church, Nassau street New York, in 1795, preaching in German and English. His eloquence drew large audiences. In 1800 he was called to the Third, or Pine street Presbyterian church, in Philadelphia. In 1805 he accepted the pastorate of the Presbyterian church in Rutger street New York. In 1813 he transferred his relations to the Reformed church, and became pastor of the Collegiate Dutch church in New York. In 1825 he was elected professor of polemic and didactic theology in the seminary at New Brunswick, N. J., at the same time president of Rutgers college, and professor of moral philosophy; which offices he retained until 1841, when he retired to private life. He declined several offers of high position in the church. He was one of the founders of the American Bible society. Dr. Milledoler was a man of great unction and power in the pulpit, and uncommonly gifted in the conduct of public prayer.

MILLE LACS, a co. in e. central Minnesota, bounded on the n. by lakes of the same name; drained by Rum river; 570 sq.m.; pop. '80, 1501—242 of foreign birth. The surface is undulating, and mostly covered with forests. Wheat, corn, and hay are raised, but the chief industry is in getting out and sawing lumber. Chief town, Princeton.

MILLENARIANS (MILLENNIUM, *ante*), in a general sense all who believe that Christianity will attain in the future a marked degree of prevalence through the world. Their faith in this rests on many prophetic descriptions and promises. But that the triumph will be for a limited period is founded on a declaration in the Apocalypse that Satan will be confined in the bottomless pit for a thousand years, and that during the same period the souls of the martyrs and others will live and reign with Christ. Some interpret this period literally; others think that the definite period is put for one indefinitely long; and a third class suppose that a day stands for a year, and consequently that an exceedingly long period is marked out. But while these differences of opinion are found among the general class, a more radical difference divides modern millenarians into two great classes: the one affirming that the period of a thousand years will be introduced by and follow the second visible coming of Christ; the other declaring that the second coming will be after the millennium, and will introduce the end of the world. The first are called strictly premillenarians but in popular usage the title millenarians is almost entirely restricted to them. They hold that the second coming of Christ will be in order to reign visibly on the earth to subdue the obstacles that now restrict the extension of his kingdom, and to destroy the personal enemies of it and of himself. And simultaneously with his coming they believe there is to be a resurrection of a part or of the whole of those who have died in Christ, but that the resurrection of the remainder of mankind will not take place until the end of the world. This point is of vital importance to their whole system. If it be true, much that they teach with it must be admitted; if it be false, the whole system falls to the ground. Their belief in the first partial resurrection rests on three passages of Scripture. The first is: 1. Thess. iv. 16, "The dead in Christ shall rise first." Here, they argue, the distinction drawn is between the dead who are Christians and those who are not; and it is declared that the Christians shall rise first. But to this those who hold the contrary opinion reply that the distinction which the apostle draws is between two classes of Christians—those who have died or will die before the coming of the Lord, and those who then will be living on the earth. The latter, he affirms, shall not prevent (shall not have any priority or advantage over) their brethren who are dead; but that at the coming of the Lord first the dead in Christ will rise, and afterwards those who remain alive shall together with them be caught up to meet the Lord in the air. In this passage, therefore, those who are not premillenarians find no intimation that one portion of the dead will rise before other portions. The second passage, supposed by some to teach that the resurrection of Christians

will precede that of other men, is 1. Cor. xv. 22–24, "For as in Adam all die, even so in Christ shall all be made alive. But every man in his own order: Christ the firstfruits; afterwards they that are Christ's at his coming. Then cometh the end, when he shall have delivered up the kingdom to God." Here, premillenarians say, it is taught that the resurrection takes place in the following order: (1) That of Christ. (2) That of his people. (3) That of other men. And, as between the resurrection of Christ and that of his people a long interval is placed, so there may be a period of less or greater extent between the resurrection of believers and that of unbelievers. To this the other side reply that Paul speaks throughout the passage only of the resurrection of believers. This some among the Corinthians denied, and this, therefore, he undertook to prove, making no reference to the resurrection of other men, knowing that the one sufficiently involved the other. And the "end" of which he speaks, refers, they say, not to the resurrection, but to the completion of the work of redemption, when Christ shall have put down all opposing rule, authority, and power. But the passage which apparently favors the pre-millenarian view most strongly, and without which the others probably would not be supposed to have much force, is Rev. xx. 4–6: "I saw the souls of them that were beheaded for the witness of Jesus, and for the word of God, and which had not worshiped the beast, neither had received his mark upon their foreheads, or in their hands; and they lived and reigned with Christ a thousand years. But the rest of the dead lived not again until the thousand years were finished, This is the first resurrection. Blessed and holy is he that hath part in the first resurrection; on such the second death hath no power, but they shall be priests of God and of Christ, and shall reign with him a thousand years." Premillenarians, interpreting this passage literally, regard it as teaching that a thousand years before the end of the world, when Christ shall come to reign visibly on the earth, there will be a resurrection of Christians from their graves to dwell here, and share with Christ the glories of his reign. To this those on the other side reply that the passage is to be understood not literally, but as a symbolic representation of the actual event. At the beginning of the book it is said that God *signified* the revelation to his servant John; that is, represented it by signs or symbols. Accordingly, the book contains a succession of symbols in which the actual meaning is set forth with striking impressiveness. There are 7 stars, 7 golden lamps, 4 horses and their riders; and so on through the book. Some of them are interpreted, e.g., the stars, the lamps, and the golden censer; others the reader is left to study out for himself. At the beginning of chap. xx. there are two principal symbols employed. 1. The binding of Satan in which the bottomless pit, the key, the chain, are symbols of the suppression of Satan's power over the souls of men. 2. John says that he saw certain classes of souls, that he describes, and that they lived and reigned with Christ a thousand years. That which he saw was—as those who argue against a literal resurrection think—a symbol of the actual event intended to be foretold, viz. the zeal for Christ that his disciples would display. This would be so remarkable that the souls of martyrs would be an appropriate symbol of it; a symbol worthy to be ranked among those employed in this book of revelation. Tried even by this high standard, what symbol, it is asked, could be more significant of devoted zeal than that here employed? How could the piety of a man be more highly commended than to say he has the soul of a martyr? What could be said more expressive of power in a church than that all its members manifest the spirit of those who had forfeited their lives for the testimony of Jesus? How could irresistible power in Christendom be more strikingly expressed than by saying that nowhere or by no person is any other spirit manifested than the spirit of martyrs. Yet, according to this interpretation, John says this will be the case in the millennium. "The rest of the dead lived not again until the thousand years were fulfilled." There will be none like them in all that time. The souls of the wicked, of the worldly, of double minded, half-hearted, or timid Christians, are not an appropriate symbol of Christians in millennium times. And these devoted ones, it is added, shall reign with Christ during the thousand years. They shall not only be devoted to him, but also happy with him. The martyr's zeal will be united with the prosperity of triumphant times. The symbol having been given, the interpretation is added: "This is the first resurrection." That is, the new life of the soul which comes with faith in Christ. This is experienced before the resurrection of the body, and is therefore called the first resurrection. The Savior foretold both together, and placed this first. "The hour is coming, and now is, when the dead shall hear the voice of the Son of God, and they that hear shall live." This describes the resurrection of the soul which was even then taking place. After that comes the description of the general resurrection—even of all that are in the graves. And all through the epistles this resurrection of the soul is affirmed, and its importance is magnified as by the power of Christ, the source of all the life of Christianity in the church. This, therefore, is actually "the first resurrection," separated from the general resurrection by the whole period between the first preaching of the gospel and the last day. And besides this, those who are not premillenarians say there is nothing else foretold in Scripture to which the name, first resurrection, is to be applied. It is probable that neither of these interpretations is found satisfactory in every point by the great mass of the nominal adherents to either view. On each side a few leaders are enthusiastically sure; but the common Christian feeling is that in each view there is some strength and much weakness; that while the strict premillennial view from a flat

literal interpretation of a few texts, tends to an externalism and a gross materialism in the handling of noble spiritual facts, the opposite and more usual view tends to dissolve all spiritual facts in a vast sea of symbolism, and this on a principle of interpretation by which any words in Scripture may be turned to almost any meaning. The usual expedient of seeking a view carefully limited between the two extremes and antagonizing both, seems scarcely feasible in this case. This is not the place to say more than that the truth will probably be found not between, but combining both—not so much rejecting either, as solvent and comprehensive of both in some higher range of thought.

MILLENNIUM (Lat. a thousand years' time) designates a certain period in the history of the world, lasting for a long indefinite space (vaguely a thousand years), during which the kingdom of Messiah will, according to tradition, be visibly established on the earth. The idea originated proximately in the Messianic expectations of the Jews; but more remotely, it has been conjectured, in the Zoroastrian doctrine of the final triumph of Ormuzd over Ahriman, and was connected by the Christians with the *Parousia*, or Second Coming of Christ. The notion of a golden age, preserved by the converts from heathenism to Christianity, as well as the oppression and persecutions to which they were long subjected by the state authorities, were naturally calculated to develop and strengthen such hopes. The chief basis of the millenarian idea in Judaism as well as in Christianity, however, is the ardent hope for a visible divine rule upon earth, and the identification of the church with that of which it is merely a symbol. In the 1st c. of the church, millenarianism (the Greek equivalent of which, *chiliasm*, from *chilioi*, a thousand, is the term employed by the fathers) was a widespread belief, to which the book of Daniel, and more particularly the pictorial predictions of the Apocalypse (chaps. xx. and xxi.), gave an apostolical authority; while certain prophetical writings, composed at the end of the 1st and the beginning of the 2d c.—such as the *Testament of the Twelve Patriarchs*, the *Fourth Book of Esdras*, the *Revelation of Saint Peter*, etc.; also the *Christian Sibylline Books*, the *Epistle of Barnabas*, the *Shepherd of the Pseudo-Hermas*, several Midrashim, Targums, and other works of a partly legendary character embodied in the *Talmud*—lent it a more vivid coloring and imagery. The unanimity which the early Christian teachers exhibit in regard to millenarianism, proves how strongly it had laid hold of the imagination of the church, to which, in this early stage, immortality and future rewards were to a great extent things of this world as yet. Not only the heretic Cerinthus, but even the orthodox doctors—such as Papias, bishop of Hierapolis, Irenæus, Justin Martyr, etc.—delighted themselves with dreams of the glory and magnificence of the millennial kingdom. The *Sibylline Books*, for instance, hold that the earth will be cultivated throughout its length and breadth, that there will be no more seas, no more winters, no more nights; everlasting wells will run honey, milk, and wine, etc., etc. Papias, in his collection of traditional sayings of Christ (*Kuriakōn Logiōn Exēgēseis*), indulges in the most monstrous representations of the rebuilding of Jerusalem, and the colossal vines and grapes of the millennial reign. Every vine will bear 10,000 branches, every branch 10,000 shoots, every shoot 10,000 sprigs every sprig 10,000 bunches, every bunch 10,000 berries, every berry 36 times 25 gallons of wine; and if a Saint come to pluck a berry, they will all cry out: "Pluck me, O Saint, I am better, and praise the Lord through me." The Talmud calculates the height of the men of the millennium to be, as before the fall, of 200—900 yards; the moon shall be, according to a prophetical dictum, like the sun; the sun shall be increased 343 times; and every Israelite will beget as many children as there were Israelites going out from Egypt—60,000. Each grape will be large enough to fill the biggest ship. Above all, however, the land of Israel will be free again, and the primitive worship restored with unheard-of splendor. "Such a chiliasm," Neander justly remarks, could only "promote a fleshly eudaimonism;" and indeed ere long it called into more energetic activity the opposition of Gnostic spiritualism. According to the general opinion, which was as much Christian as Jewish, the millennium was to be preceded by great calamities, reminding us in some degree of the Scandinavian ragnarök (or "Twilight of the Gods"). The personification of evil appeared in *Antichrist*, the precursor of Christ (identified, during 1st c., with Nero), who would provoke a frightful war in the land of Magog (Ezek. chaps. xxxviii. and xxxix.) against the people of Gog, after which the Messiah—some say a double Messiah, one the son of Joseph, vanquished in the strife; the other, the victorious son of David—would appear, heralded by Elias, or Moses, or Melchizedek, or Isaiah, or Jeremiah, and would bind Satan for a thousand years, annihilate the godless heathen, or make them slaves of the believers, overturn the Roman empire, from the ruins of which a new order of things would spring forth, in which the "dead in Christ" would arise, and along with the surviving saints enjoy an incomparable felicity in the city of the "New Jerusalem," which was expected to descend literally from heaven. To the innocence which was the state of man in Paradise, there was associated, in the prevalent notions of the millennium, the finest physical and intellectual pleasures.

In the Mosaic account of creation, we find the primitive ground for making the victorious era of the church last a thousand years. That account was regarded by the Jews and by the Judaic Christians as a type of the destinies of creation. Now, by a strictly literal interpretation of the 4th verse of the 90th Psalm, it was supposed that a day of God was arithmetically equal to a thousand years; hence the 6 days of creation were

understood to indicate that the earth would pass through 6,000 years of labor and suffering, to be followed by a 7th day—that is, 1000 years of rest and happiness. In the Book of Revelation (chap. xx.) this view is presented. Still, the rabbinical traditions differ widely among themselves as to the duration of the happy period. Instead of 1000 years, some of them count 40, 70, 90, 365, 400, 600, 2,000, or 7,000, or so many years as have elapsed from the creation of the world or the flood. The Gospel of Nicodemus makes it 500 years, etc. In fact, the systems of apocalyptic chronology were of a varied and somewhat arbitrary cast; according as their originators laid greater stress upon the Apocalypse, the Book of Daniel, the Song of Songs, the Jewish "Gematria," or Computation of Letters—a very pliable art in itself—or on astronomy, astrology, "natural phenomena," and the like.

The lapse of time chilling the ardor of the primitive Christian belief in the nearness of the *parousia* had without doubt also the tendency to give a more shadowy, and therefore a more spiritual aspect to the kingdom over which the expected Messiah was to reign. The influence of the Alexandrian philosophy contributed to produce the same result. Origen, for example, first started the idea that instead of a perpetual opposition of paganism to Christianity—instead of a final and desperate conflict between the two—instead of an insolent triumph on the part of the saints, and a servile submission on the part of the unbelievers, the real progress and victory of Christianity would consist in the gradual spread of the truth throughout the world, and in the voluntary homage paid to it by all secular powers. This was an immense advance on the views previously entertained. It is owing largely to Origen and his disciple Dionysius that more spiritual conceptions of the millennium finally established themselves in the church; at all events, they furnished the fathers with the majority of their arguments. Yet even in the Egypto-Alexandrian church, millenarianism, in its most literal form, was widely diffused, and was only eradicated by the great wisdom and moderation of Dionysius. The Montanists (q.v.) generally, as might be expected from the enthusiastic tendencies of the sect, were extreme millenarians or chiliasts, and, being considered a heretical sect, contributed largely to bring chiliasm into discredit, or, at all events, their own carnal form of chiliasm, which Tertullian himself attacked. Caius, the presbyter, in his "Disputation" against the Montanist Proclus, traces its origin to the hated heretic Cerinthus, whom he accuses of forging a certain revelation, which he passed of as the work of an apostle. From his description of this revelation it is almost certain—strange as it may appear—that he alludes to the canonical Apocalypse. Lactantius, in the beginning of the 4th c., was the last important church father who indulged in chiliastic dreams, while among its earlier advocates may be mentioned chiefly Nepos, Methodius, Korakion, Apollinarius, Victorinus, etc. In the 5th c. St. Jerome and St. Augustine expressly combated certain fanatics who still hoped for the advent of a millennial kingdom whose pleasures included those of the flesh. But from this time the church formally rejected millenarianism in its sensuous "visible" form, although the doctrine every now and then made its reappearance, especially as a general popular belief, in the most sudden and obstinate manner. Thus the expectation of the *last day* in the year 1000 A.D. re-invested the doctrine with a transitory importance; but it lost all credit again when the hopes, so keenly excited by the crusades, faded away before the stern reality of Saracenic success, and the predictions of the *Everlasting Gospel*, a work of Joachim de Floris, a Franciscan abbot (died 1212), remained unfulfilled.

At the period of the reformation, millenarianism once more experienced a partial revival, because it was not a difficult matter to apply some of its symbolism to the papacy. The pope, for example, was *Antichrist*—a belief still adhered to by some extreme Protestants. Yet the doctrine was not adopted by the great body of the reformers, but by some fanatical sects, such as the Anabaptists and by the Theosophists of the 17th century. During the civil and religious wars in France and England, when great excitement prevailed, it was also prominent. The *fifth monarchy men* of Cromwell's time were millenarians of the most exaggerated and dangerous sort. Their peculiar tenet was that the millennium *had* come, and that *they* were the saints who were to inherit the earth. The excesses of the French Roman Catholic Mystics and Quietists terminated in chiliastic views. Among the Protestants it was during the *thirty years' war* that the most enthusiastic and learned chiliasts flourished. These may—broadly—be brought under the three chief heads of *exegetical* chiliasts, who, by some biblical dates, endeavored to compute the predicted time; *alchemistic* or *cabalistic* chiliasts, who endeavored to hasten the period by some mystical discovery; and *politico-theocratic* chiliasts, who wished to reduce the governments of the world to a biblical standard. See ANABAPTISTS, MÜNZER. The awful suffering and wide-spread desolation of that time led pious hearts to solace themselves with the hope of a peaceful and glorious future. Since then the penchant which has sprung up for expounding the prophetical books of the Bible, and particularly the Apocalypse, with a view to present events has given the doctrine a faint semi-theological life, very different, however, from the earnest, practical faith of the first Christians. Among the foremost chiliastic teachers of modern centuries are to be mentioned Ezechiel Meth, Paul Felgenhauer, bishop Comenius (*Lux in Tenebris*, 1657); prof. Jurien (*L'Accomplissement des Prophéties*, 1686); Serarius (*Assertion du Regne de Mille Ans*, etc., ab. 1670); Poiret (*Economie Divine*, 1687); J. Mede (*Clav. Apocal.* 1627); while Thomas Burnet and W. Whiston endeavored to give chiliasm a geological foundation, but with-

out finding much favor. Spener, on account of his *Hoffnung besserer Zeiten*, has been accused of chiliasm; no less Joachim Lange (*Licht und Recht*); and Swedenborg employed apocalyptic images to set forth the transfigured world of the senses. Latterly, especially since the rise and extension of missionary enterprise, the opinion has obtained a wide currency that after the conversion of the whole world to Christianity, a blissful and glorious era will ensue; but not much stress—except by extreme literalists—is now laid on the nature or duration of this far-off felicity. In fact, the common Christian conception of a millennium without a visibly present Christ, as held at the present day, is little different, so far as results are concerned, from the belief of philosophers in the perfectibility of the race. The essence of both conceptions is the cessation of sin and sorrow, the prevalence of holiness and happiness. But this departs widely from the "ancient hope of the church"—a kingdom of visible majesty, with Jesus and the saints ruling the world from Jerusalem, the central city of the earth!

Great eagerness and not a little ingenuity have been exhibited by many persons in fixing a date for the commencement of the millennium. The celebrated theologian, Johann Albrecht Bengel (*Erklärte Offenbarung; Reden für's Volk*), who, in the 18th c., revived an earnest interest in the subject among orthodox Protestants, asserted from a study of the prophecies that the millennium would begin in 1836. This date was long popular. Bengel's general millenarianism was adopted by Oetinger (d. 1782), and widely spread throughout Germany in a more or less poetic form by Hahn, Crusius, Jung Stilling, Lavater, and Hess (*Briefe über die Offenb. Joh.*). Some of the greatest of the more recent German theologians are millenarians, such as Rothe, Delitzsch, Hoffman, Kurtz, Hebart, Thiersch, Nitzsch, P. Lange, and Ebrard. Swedenborg, to whom reference has already been made, held that the last judgment took place in 1757, and that the new church, or "Church of the New Jerusalem," as his followers designate themselves—in other words, the millennial era, then began. In America, considerable agitation was excited by the preaching of one William Miller, who fixed the second advent of Christ about 1843. Of late years, the most noted English millenarian is Dr. John Cumming, who originally placed the end of the *present dispensation* in 1866 or 1867; but as that time drew near without any millennial symptoms, he was understood to have modified his original views considerably, and now conjectures that the beginning of the millennium will not differ so much after all from the years immediately preceding it, as people commonly suppose. See Corrodi's *Kritische Geschichte des Chiliasmus* (Zurich, 1794, 4 vols.); Calixtus, *De Chiliasmo cum antiquo tum pridem renato Helmst.* (1692, 4to); Klee, *Tentam Hist. crit. de Chil. prim. sæc. Herbip.* (1825); Münter, *Dogmengeschichte*, etc. A really good history of chiliasm, however, is as yet a desideratum.

MILLEPEDE, a popular name of many kinds of *myriapoda*, of the order *chilognatha*, and chiefly of the families *julidæ* (see JULUS) and *Polydesmidæ*. In the latter family, the feet are arranged in numerous groups along both sides; otherwise, they much resemble the *Julidæ*. The largest species are found in warm climates, and some of them are brightly colored; but small species of both families are common in Britain; and some of them, as *Polydesmus complanatus*—which is lilac-colored, flattened, and from a quarter to half an inch in length—are very destructive to the roots of plants. Doubt has been expressed if they attack roots perfectly healthy; but at all events, they take advantage of incipient decay, and greatly extend and accelerate it. The application of salt, lime, nitrate of soda, etc., has been often recommended as a preventive of their ravages.—The name PILL MILLEPEDE is often given to those shorter *Chilognatha*, of the family *Glomeridæ*, which, when disturbed, roll themselves up into an almost globular form, like the crustacean called armadillo. *Glomeris marginata* is common in Britain, under stones and among moss. Some of the tropical species are large and finely colored.

MILLEPORE, a genus of hydrozoa which have recently been placed in a new subclass, *hydrocerallinæ* by Mr. Moseley. It contributes largely to the formation of coral reefs in the West Indies and Pacific. The calcareous skeleton is mostly in the form of laminar expansions having the surface studded with minute holes of two sizes, the larger being the fewest. The larger openings are the mouths of tubes which are divided by transverse calcareous partitions into a number of compartments, only the most superficial of which contain the animals. The smaller tubes are similarly constructed, and the general tissue of the skeleton is composed of trabeculæ traversed by a series of anastomosing canals which place the tubes occupied by the zoöids in direct communication. On account of some resemblance in the skeleton the *millepora* were formerly classed with the labulate corals. The late Prof. Agassiz was the first to examine the living animals, and he at once referred the genus to the *hydrozoa*. Mr. Moseley arrived at the same conclusion, and has recently had opportunities of examining the living animal minutely. According to him the colony of millepores consist of two kinds of zoöids. The larger, or gastrozoöids occupy the larger tubes of the skeleton, while the smaller, or dactylozoöids occupy the smaller tubes, which are generally placed around the larger in somewhat of a systematic arrangement. The small, or dactylozoöids have no mouth and are long and slender, carrying on their sides numerous short, clavate tentacles. They perform the functions of prehension for the colony, and supply food to the stomach bearing gastrozoöids, which perform the work of digestion and assimilation for the family. The nutritive fluid thus elaborated is distributed to the colony through branched

canals which ramify in every direction. The reproductive process is still unknown. See INVERTEBRATE ANIMALS.

MILLER, a co. in s.w. Georgia, drained by Spring creek, a branch of the Chattahoochee river, and intersected by the Atlantic and Gulf railroad; 260 sq.m.; pop. '80, 3,720—1393 colored. The surface is level and moderately productive; corn, oats, sweet potatoes, butter, molasses, and cotton, are the staples; of the last the annual yield is about 1700 bales. Chief town, Colquitt.

MILLER, a co. in s. Missouri, drained in the n. by the navigable Osage river; 600 sq.m.; pop. '80, 9,807—9,561 of American birth, 230 colored. Its surface is hilly and nearly equally divided between woodland and prairie; the timber including walnut and sugar-maple trees. In some sections, and along the river bottoms, the soil produces corn, wheat, oats, tobacco, and maple-sugar; and live stock is raised to some extent. The Osage river furnishes water-power, and lead and iron are mined. Lumber is manufactured. Capital, Tuscumbia.

MILLER, CINCINNATUS HEINE (JOAQUIN MILLER), b. Ind., 1841; while still a boy was taken to Oregon by his parents, and practiced mining in California. He now led an adventurous life, beginning as a volunteer with gen. Walker's Nicaragua expedition in 1855; continuing among the Indians of the Pacific coast; and concluding with his appointment to a county judgeship in Oregon in 1866. In 1860 he had made some attempt at studying law; and in the following year edited a paper at Eugene City, Or., which was suppressed by the authorities for disunion sentiments. In 1870 he visited the eastern states, and thence went to England; where, in the following year, he published his *Songs of the Sierras*, which caused him to be accepted for a time as a "lion" in London society. The poems contained in this volume had previously been published in the United States, where they had made very little impression. Mr. Miller afterwards published other volumes of poetry, and achieved a considerable reputation. He is the author of *The Danites*, which was successful in the United States and England.

MILLER, EDWARD, 1760–1812; b. Del.; son of the rev. John Miller, who was settled over a Presbyterian society in Dover, Del., 43 years, and brother of Samuel Miller, D.D., late professor in the theological seminary at Princeton, N. J. Having acquired a classical education, he attended a course of medical lectures at the university of Pennsylvania and had a year's experience at the military hospital at Baskingridge, N. J. He was surgeon's mate in the U. S. army in 1780, and in 1782 crossed the ocean as surgeon of a French ship of war. Retiring to private life in 1783, he had a successful practice in Frederica, Del., and in Maryland. In 1788 he received the degree of M.D. from the university of Pennsylvania. In 1797, associated with Dr. Samuel L. Mitchill and Elihu N. Smith, he established the *Medical Repository* in the city of New York, the first American medical journal, and was connected with it at the time of his death, witnessing the publication of the 14th vol. and a part of the 15th. He and his coadjutors were members of the Friendly club, whose list bore the names of Dunlap, Brown, Bleecker, and Kent. In 1803 he was appointed city physician of New York. He was a member of the American philosophical society, and published a *Treatise on the Yellow Fever of New York in* 1805, taking the ground that it was not contagious. He was connected with the university of New York in 1807 as professor of the theory and practice of medicine, and in 1809 with the New York hospital as clinical lecturer. He was very popular in the profession and had a large acquaintance. He was associated with his brother Samuel in his *Brief Retrospect of the Eighteenth Century*. He advocated temperance principles, and deprecated the use of tobacco. In 1814 a memoir of him was published by his brother Samuel in connection with his medical works; and in the *American Medical and Philosophical Register* has appeared a biographical notice by John W. Francis, M.D., of New York. He was distinguished for his learning as a scholar, his generosity and humanity as a physician, and held a high rank among American men of science.

MILLER, HENRY, 1751–1824; b. Penn.; originally intending to practice law, he became a member of the bar, but before becoming established the revolutionary war broke out and he left for the rendezvous with a lieutenant's commission, and marched with his company to Boston. He was soon promoted to col. of the regiment, and led his command in the New Jersey campaign. At the battle of Monmouth, June 28, 1778, between the American forces under Washington and the British under sir Henry Clinton, he had two horses shot under him, and he bore a record for dauntless bravery through the war. He was at one time quartermaster-gen., and at the close of the war turned his attention to mercantile pursuits, doing business in Baltimore. In the second year of the war of 1812 he held the position of brig.gen., commanding the defenses at Baltimore. On the restoration of peace he was appointed, among other offices of trust under government, to be superintendent of revenue for the district of Pennsylvania.

MILLER, HENRY, 1800–74; b. Ky.; studied medicine in Lexington with the celebrated surgeons Dudley and Caldwell, and, having taken his degree of M.D., commenced the practice of medicine in Glasgow, pursued it in Harrodsburg, and finally, in 1835, settled in Louisville as professor of obstetrics and diseases of women and children in the university school of medicine. He made frequent contributions to the prominent medical journals, and was much respected by the profession. In 1849 he published *Human*

Parturition, and in 1858 *The Principles and Practice of Obstetrics*, the latter work being a revision of the former enlarged and rewritten, adding the views of Dubois, Cazeaux, Simpson, W. Tyler Smith, and others to his own valuable experience, and giving the results of the obstetric schools of America, Paris, London, and Edinburgh—adapting the knowledge so gained to the wants of students. In 1859 he was elected president of the American medical association, and afterward professor emeritus in the Louisville medical college.

MILLER, HOMER V. M., b. Pendleton co., S. C., 1814; studied medicine at the state medical school of South Carolina, and graduated with high honors in 1835. He then spent three years in the further study of his profession in Paris, began practice in Cassville, Ga., and soon became known not only as a very skillful physician, but also as a public speaker and propagator of education and religion. He occupied a medical professorship at both Memphis, Tenn., and Augusta, Ga.; at the outbreak of the civil war became a surgeon in the confederate army, and was promoted to the rank of division surgeon and then medical director of the Georgia military department. From 1865 to 1869 he was a professor in the Atlanta medical college, and now resides in that city. In 1869 he was elected U. S. senator from Georgia to fill an unexpired term, and took an active part in the acceptance by the state of the reconstruction acts.

MILLER, HUGH, a distinguished geologist, was b. in Cromarty, in the north of Scotland, Oct. 10, 1802. He was descended from a family of sailors, and lost his own father by a storm at sea when he was only five years of age. In consequence of this misfortune he was brought up chiefly under the care of two of his mother's uncles, one of whom ("uncle Sandy") imbued him with a taste for natural, and the other ("uncle James") for traditional, history. He acquired a good knowledge of English at the Cromarty grammar-school. Before his 11th year he had read those glorious romances of childhood, *Jack the Giant-killer, Jack and the Beanstalk, Sindbad the Sailor, The Yellow Dwarf*, and *Aladdin and the Wonderful Lamp*, besides several other works of higher literary pretensions. As he grew older he became extremely fond of the great English poets and prose writers. From his 17th to his 34th year he worked as a common stone-mason, devoting his leisure hours to independent researches in natural history, and to the extension of his literary knowledge. In 1829 he published a volume entitled *Poems written in the Leisure Hours of a Journeyman Mason*, which was followed, a few years afterwards, by *Scenes and Legends of the North of Scotland*. His attention was soon drawn to the ecclesiastical controversies which were agitating Scotland, and his famous *Letter to Lord Brougham* on the "Auchterarder case" brought him prominently into notice. In 1840 he went to Edinburgh as editor of the *Witness*, a newspaper started in the interest of the non-intrusion party in the church of Scotland, and in the course of the same year published in its columns a series of geological articles, which were afterwards collected under the title of *The Old Red Sandstone, or New Walks in an Old Field*. These articles were very remarkable, both in a scientific and literary point of view. They contained a minute account of the author's discovery of fossils in a formation believed, until then, to be destitute of them, and written in a style which was a harmonious combination of strength, beauty, and polish. At the meeting of the British association in the same year (1840) he was warmly praised by Murchison and Buckland, and in fact his discoveries were the principal topic of discussion among the savans. His editorial labors during the heat of the disruption struggle were immense, and so seriously injured his health that for some time he had to give up all literary activity. About 1846 he resumed his pen, and became the most vigorous and eloquent writer in the service of the newly constituted free church. After ten years of hard, earnest, fagging toil his brain gave way, and in a moment of aberration he put an end to his own existence, at Portobello, near Edinburgh, on the night of the 23d or morning of the 24th Dec., 1856. Miller's principal works, besides those already mentioned, are: *First Impressions of England and its People; Footprints of the Creator, or the Asterolepis of Stromness*, designed as a reply to the *Vestiges of the Natural History of Creation; My Schools and Schoolmasters, or the Story of My Education;* and *Testimony of the Rocks*, the last of which is an attempt to reconcile the geology of the Pentateuch with the geology of nature, by the hypothesis that the days mentioned in the first chapter of Genesis do not represent the actual duration of the successive periods of creation, but only the time occupied by God in unrolling a panoramic vision of these periods before the eyes of Moses.

Miller's services to science have undoubtedly been great, but he is even more distinguished as a man than as a savant. Honest, high-minded, earnest, and hugely industrious, a true Scot, a hearty but not a sour Presbyterian (for he loved Burns as much as he revered Knox), there are few of whom Scotland has better reason to be proud than "the stone-mason of Cromarty." Besides his autobiography quoted above, see Life by Peter Bayne (2 vols., 1871).

MILLER, JAMES, 1776–1851; b. N. H.; was educated for the bar, but when not far from 30 years old entered the army as maj. and took part in the frontier warfare, where he displayed great gallantry. In 1812 he was made col. by brevet, and in 1814 took part in the Canadian invasion in command of the 21st infantry. In the battles of Chippewa and Lundy's Lane he did material service. The latter contest was virtually decided by his gallant charge on a British battery. These services were recognized by congress: a

gold medal was presented him, and he was promoted to the rank of brig.gen. From 1819–25 he was governor of Arkansas, then a territory; and from that time until he reached the age of 73 was collector of the port of Salem, Mass.

MILLER, JOAQUIN. See MILLER, CINCINNATUS HEINE.

MILLER, JOSEPH, 1684–1738, an English actor of low comedy, whose name can be found in the casts of Congreve's plays. He was noted for his wit off as well as on the stage, and his name was given to a collection of jokes printed by one John Motley in 1739. The term "a Joe Miller" is now in common use to denote an ancient or stale witticism. The tomb of the original Joe Miller may still be seen in St. Clement's churchyard in the Strand, London.

MILLER, PATRICK, 1730–1815; b. Dalwinston, Scotland. A man of wealth and of a mechanical turn of mind, he began in 1785 to experiment in the construction and propulsion of a vessel in a lake near his estate, and in 1786 gave an account of a vessel which he had made, maintaining in a pamphlet that the steam-engine could be made to work the wheels. With the aid of James Taylor he propelled a boat 5 m. an hour by the steam-engine. But for some reason the experiment was unsatisfactory, and was abandoned.

MILLER, SAMUEL, D.D., 1769–1850; b. Delaware, son of the rev. John Miller, who was a native of Boston and pastor of the Presbyterian church at Dover, Del. The son was graduated at the university of Pennsylvania in 1789 with the highest honors of his class; commenced the study of theology with the guidance of his father and finished the course under Dr. Nesbit, at Dickinson college; was licensed to preach in 1791; in 1793 was colleague pastor with Drs. McKnight and Rogers, of the first Presbyterian church, New York city, and afterwards of the Wall street church until 1813. He was active in establishing the theological seminary at Princeton, N. J., in which he was professor of church history and government from 1813 till his death. His admirable natural qualities of person, mind, and heart were highly improved by assiduous culture. His manners were remarkably dignified and urbane. In character and attainments he was eminently qualified to be one of the founders and builders of a theological school, and his influence, combined with that of his distinguished colleague Dr. Archibald Alexander—the one being an admirable complement to the other—on successive classes of students can hardly be over-estimated. His preaching was luminous and earnest, his lectures were learned, catholic, enthusiastic, and enlivened with wit and literary grace. He was prominent in the counsels of the Presbyterian church. Among the many works which he published may be mentioned: *Letters on the Constitution and Order of the Christian Ministry; Letters on Unitarianism; On the Eternal Sonship of Christ; Clerical Manners and Habits; On the Utility and Importance of Creeds and Confessions; On the Office of Ruling Elder; On Baptism; Letters from a Father to his Son in College; Thoughts on Public Prayer.*

MILLER, THOMAS, 1807–74; b. Gainsborough, Lincolnshire, Eng. At first a farmer's boy, then a basket-maker, he spent his leisure in study, and wrote pieces in poetry and prose on rural life and scenery, which attracted attention, and were noticed with favor by Moore, Campbell, and Rogers. By the help of Rogers he became a bookseller. His principal novels are *Royston Gower; Fair Rosamond; Lady Jane Grey; Gideon Giles the Roper; Godfrey Malvern.* Among his popular books are those pertaining to the country, including *A Day in the Woods; Beauties of the Country; Rural Sketches; Pictures of Country Life; Country Scenes.* His poems are entitled, *Common Wayside Flowers; Poetical Language of Flowers; Original Poems for my Children; Songs for British Riflemen.* He wrote also a *History of the Anglo-Saxons,* and *Lives of Turner, Beattie, and Collins.*

MILLER, WILLIAM, 1781–1849; b. Mass; served during the war of 1812 as a volunteer with the rank of captain, on the Canadian frontier. He was a farmer, and his education limited, but he applied himself to the study of the prophecies, and in 1833 began to lecture on the second coming of Christ, and to predict the destruction of the world in 1843. The very day was named either by himself or by his followers. For 10 years he continued his prophecies, and his converts in the United States, Canada, and Great Britain, called Millerites, Adventists, or Second Adventists, were estimated at 50,000. In consequence of the repeated failure of his predictions his followers gradually forsook him. They, however, regarded him as a man of more than ordinary intellectual power, a cool and honest reasoner, and a sincere devoted Christian. This may be conceded, though he evidently was a blind and ignorant guide.

MILLER, WILLIAM ALLEN, 1817–70; b. England, was a student first at the merchant tailor's school, and having served five years in apprenticeship to his uncle, who was hospital surgeon at Birmingham, took his degree at King's college, London, studying chemistry with Dr. Daniell, under whose direction he investigated the electrolysis of salts. He afterward went to Giessen and studied in the laboratory of Liebig. In 1840 he became demonstrator of chemistry in King's college, London, and in 1845 professor of chemistry there. He has contributed valuable scientific articles to medical and philosophical journals, and in 1851 was appointed assayer at the mint and bank of England, and water commissioner. He was elected president of the chemical society, and vice

president of the royal society; and published in 1850 *Elements of Chemistry, Theoretical and Practical.*

MILLER, WILLIAM HALLOWES, b. in 1801 in Carmarthenshire, Wales; educated at St. John's college, Cambridge, and after graduating in 1826, became a fellow and tutor of the college; in 1832 was appointed professor of mineralogy; in 1838 was elected a fellow of the royal society, and since has been elected a member of all the great scientific and philosophical societies of Europe and America. From 1843 to 1854 prof. Miller was engaged as member of a government commission in replacing the standards of weight and measure, which had been destroyed by fire, taking as his share of the work the standard of weight; in 1867 he was again placed on a commission to examine the exchequer standards, and in 1867 on the "*commission internationale du mètre.*" The reports of these bodies all gave the credit of their success in great part to prof. Miller's accuracy and scientific experience. He was one of the first to employ the Wallaston goniometer in measuring the angles of crystals, and among his many contributions to the *Proceedings of the Royal Society*, and other scientific publications, are several articles on the subject of crystallography. In 1865 the degree of LL.D. was bestowed upon him by Dublin university, and in 1876 Oxford made him a doctor of civil laws; he was for 17 years secretary of the royal society.

MILLERITES. See ADVENTISTS, *ante;* SEVENTH DAY ADVENTISTS; MILLER, WILLIAM.

MILLER'S FALLS, a village in Massachusetts, partly in the township of Montague and partly in Erving, in the county of Franklin. It was originally called Grout's Corners; and is pleasantly situated on Miller's river, which affords valuable water power near the point where it empties into the Connecticut. It is at the junction of the New London Northern and the Vermont and Massachusetts railroads. It has extensive factories, where tools are made; and it has an increasing trade.

MILLER'S THUMB. See BULLHEAD.

MILLET, a grain, of which there are several kinds, the produce of species of *panicum, setaria,* and allied genera. The genus *panicum* contains many species, natives of tropical and warm temperate countries, and some of which, as *Guinea grass* (q.v.), are amongst the largest fodder grasses. The flowers are in spikes, racemes, or panicles; the glumes very unequal, one of them often very minute; each spikelet containing two florets, one of which is often barren. The genus *setaria* has a spike-like panicle, with two or more bristles under the glumes of each spikelet. COMMON MILLET (*panicum miliaceum*) is an annual grass, 3 or 4 ft. high, remarkably covered with long hairs, which stand out at right angles. It has a much branched nodding panicle; the spikelets are oval, and contain only one seed. It is a native of the East Indies, but is extensively cultivated in the warmer parts of Europe and other quarters of the world. It succeeds only in those climates in which wine can be produced. It is called *warree, cheena,* and *kadi-kane* in India. The grain, which is very nutritious, is only about one-eighth of an inch in length. It is used in the form of groats, or in flour mixed with wheat-flour, which makes a good kind of bread; but bread made of millet alone is brittle and full of cracks. Poultry are extremely fond of millet. The straw is used for feeding cattle. Other species, *P. miliare, P. frumentaceum,* and *P. pilosum,* are cultivated in different parts of India, chiefly on light and rather dry soils, yielding very abundant crops. GERMAN MILLET, or MOHAR (*setaria Germanica*), and ITALIAN MILLET (*S. Italica*), regarded by many as varieties of one species, and probably originally from the east, although now naturalized in the south of Europe, are cultivated in many of the warmer parts of Europe, in India, and other countries. Italian millet is 3 or 4 ft. in height; German millet much dwarfer, and its spike comparatively short, compact, and erect; and less valuable as a corn-plant. The grains of both are very small, only about half as long as that of common millet; but they are extremely prolific, one root producing many stalks, and one spike of Italian millet often yielding 2 oz. of grain. The produce is estimated as five times that of wheat. Italian millet is called *koongoonie, kala-kangnee,* and *kora-kang* in India. The grain of these millets is imported into Britain for feeding cage-birds, and for use as a light and pleasant article of food, although for this purpose it is little used in Britain, whilst it is very extensively used in soups, etc., in the south of Europe. It does not make good bread. To the same tribe of grasses belong the genera *paspalum, pennisetum, penicellaria, digitaria,* and *milium*—species of which are cultivated in different parts of the world for their grain. *Raspalum exile* is the *fundi* (q.v.) of Africa; and *P. scrobiculatum* is the *koda* of India, where it is cultivated chiefly on poor soils. *Penicillaria spicata,* or *pennisetum typhoideum,* is very extensively cultivated in Africa, and to a considerable extent in India. Its cultivation has been introduced into the south of Europe. It succeeds best on light soils. Its Indian name is *bajree.* It often receives the names EGYPTIAN MILLET and GUINEA CORN. It has a somewhat spiked cylandrical panicle. *Pennisetum distichum* abounds in central Africa, on the southern borders of the Great Desert, where it is called *uzak,* and is described by Barth as causing much inconvenience to the traveler, the little bristles which are attached to its seeds making them stick like burs to the clothes; they also pierce the skin, and cause sores, so that it is necessary to be provided with small pincers for their extraction, and none even of the wild roving

natives is ever without such an instrument. But its seed is a common and pleasant article of food, in some places the principal food of the people, and a pleasant beverage is made from it. *Digitaria sanguinalis* is called POLISH MILLET, being cultivated in cottage gardens in Poland, where the grain is used like rice. It is a common grass in many parts of Europe, although very rare in Britain. The spikes in this genus are compound, and from their appearance give it the names *digitaria* and *finger-grass*. The MILLET GRASS (*milium effusum*) of Britain, occasionally found in shady woods, is a very beautiful grass, 3 or 4 ft. high, with a spreading pale panicle of small flowers; and has been much recommended for cultivation as a forage grass, and for the sake of its very abundant small seeds, an excellent food for game. Another species of the same genus (*M. nigricans*) is the *Maize de Guinea* of Peru, where its seeds, after being dried by heat, are converted into a very white flour, a pleasant article of food; and a beverage called *ullpu* is made from them. The name INDIAN MILLET is sometimes given to *durra* (q.v.), but it belongs to a different tribe of grasses from the true millets.

MILLET, AIMÉ, b. in Paris about 1816; son of a distinguished French painter; after studying painting under his father he studied sculpture under David d'Augers, and has become famous. Imaginative busts, female figures, busts of distinguished men, and lastly colossal figures for bronze, have indicated his genius from the commencement of his career. "L'Ariane," a female figure exhibited in 1857, regarded as one of his greatest works in marble, was bought by the government. His statue of "Mercure" for the court of the Louvre, exhibited in 1859, and "Vercingetorix," a colossal statue in bronze, finished in 1865, are among his later best works. "Apollon," the statue which crowns the grand opera house of Paris, is by him. Millet's scientific knowledge of the human form is said to equal his grace and skill in its molding.

MILLET, JEAN FRANÇOIS, 1815–75; student of painting with Delaroche in Paris. He commenced exhibiting pictures in 1844 with *la Laitière et la Leçon d'Equitation;* in 1845 exhibited *Œdipe détaché de l'Arbre;* in 1848 *les Juifs à Babylone.* From that time a marked change came over his style, and from methods of representation distinguihsed for rough vigor, he became painter of pastoral pieces of the greatest refinement of thought and execution. Of this class are the *Sémeur, La Paysanne Assis,* and *Les Botteleurs,* exhibited in 1849 and 1850. He has since become one of the greatest landscape painters in France by representations of field, peasant, and animal life the most quiet, simple, and noble. Among these are the *Berger Moissoneurs, Tondeurs de Moutons,* 1852; *Paysan se Réposant sur sa Houe,* 1863; *Bergére avec son Tronpeau,* 1864; and *Femme Battant du Beurre,* 1870. All his works are favorite subjects for engravings, and have thus become familiar works everywhere.

MILLET, PIERRE, 1631–1708; a French missionary who died in Quebec. He came to America in 1666, and labored among the Onondagas and Oneidas till 1684. Afterwards chaplain at ft. Frontinac (Kingston. Canada), from which he was lured, and taken prisoner by Indians in the service of the English. The Christianized Oneidas adopted him into their tribe, much to the chagrin of the English governor of New York, who was suspicious of his French influence with the Indians. The French governor of Canada was quite content with the situation. The narrative of his captivity was preserved and published in New York in 1865.

MILLIER. See METRIC SYSTEM.

MILLI, GIANNINA, b. in 1828 in Italy. When but a child she began to practice the composition of verses, and when a girl of seventeen or eighteen became a pupil of the poet Regaldi, the greatest of Italian improvisatores, and soon developed considerable power in improvising popular and amatory verses. As is the custom with artists of this class, she traveled and gave public exhibitions of her skill in various parts of Italy and Sicily Medals of gold and silver were awarded her, and after her trips through Tuscany and upper Italy (1857–60) a pension was bestowed upon her by Garibaldi. Since that time she has been engaged as instructress and superintendent in the schools of Naples and Rome. A number of her best efforts have been collected and published.

MILLIGRAM. See METRIC SYSTEM.

MILLIL'ITER. See METRIC SYSTEM.

MILLIM'ETER. See METRIC SYSTEM.

MILLRIND, or FER DE MOULIN, in heraldry, a charge meant to represent a mill-iron, originally a mere variety in designating the cross moline, but accounted a distinct charge by some heralds.

MILLS, a co. in s.w. Iowa; drained by the Missouri, which bounds it on the w., and by the Nishnabatona river and Keg creek, and intersected by the Kansas City, St. Joseph and Council Bluffs, and Missouri River railroads; 460 sq.m.; pop. '80, 14,135—12,860 of American birth. The surface is in great part prairie, but there are extensive woodlands. Hay, wheat, oats, Indian corn, and pork are the chief products. Co. seat, Glenwood.

MILLS CHARLES, 1788–1825; b. near Greenwich, Eng.; admitted to the bar in 1809, but devoted himself chiefly to historical study. He is the author of *History of Moham-*

medanism; History of the Crusades, 2 vols.; *Travels of Theodore Ducas*, 2 vols.; *History of Chivalry*, 2 vols.

MILLS, CLARK, b. in Onondaga co., N. Y., 1815, of poor parents; learned the trade of plasterer; and practiced it in Charleston, S. C., for nine years. Developing a taste for sculpture, in 1846 he completed a bust of John C. Calhoun, which was purchased by the city of Charleston for the city hall. In 1848 he furnished a design which was accepted, for an equestrian statue of gen. Jackson, to be placed in Lafayette square, Washington. There being no bronze-foundry for such work in the United States, Mills, after spending two years in modeling the statue, set to work to learn the art of such castings, and erected in Washington an experimental foundry, where, after many mishaps and trials he at last succeeded in Oct., 1852, in producing a perfect cast. It was accepted formally Jan. 8, 1853—the anniversary of the battle of New Orleans. Congress made an extra appropriation of $20,000 to cover his losses, and remunerate him for his time. He was next engaged on the colossal equestrian statue of Washington, which was formally received Feb. 22, 1860. For this he received $50,000. Mr. Mills's last great work was the casting of the colossal statue of Liberty, finished in 1863, which crowns the dome of the capitol at Washington. This was modeled by Crawford. There has been much harsh criticisms of Mills's equestrian statues. Doubtless the work of one without schooling in the great art of sculpture compares unfavorably with that of masters. But there are now enough poor works in the United States by those who have had the highest advantages to show that Mills had the genius for great and good work. His errors are mostly in endeavoring to render his subjects too striking, too expressive. This is especially the case with the statue of gen. Jackson, in which the horse is made to balance reared on its hind feet, and the gen. appears equally excited. Continued through many decennial periods, the pose becomes ridiculous.

MILLS, SAMUEL JOHN, Jr., 1783–1818; b. Conn.; graduated at Williams college in 1809. While in college he formed an association among those students who were considering the question of entering upon foreign missionary work. After spending a short time in the study of theology at New Haven, he entered Andover theological seminary in 1810, where, being deeply impressed with the importance of foreign missions, he endeavored to awaken the same spirit among his fellow-students. With Judson, Hall, Newell, and Nott he united in a memorial to the General association of Massachusetts (Congregational), which resulted in the formation of the American board of commissioners for foreign missions. He was licensed to preach in 1812, and spent two years in mission work in the southern and western states with Messrs. Schermerhorn and Smith. On his return he was ordained June 21, 1815. He published an account of his tour. Finding great destitution of the Bible in those states, he suggested at the close of his report the formation of a national Bible society, which resulted in the organization of the American Bible society. To him was due the formation of the *United* foreign mission society, and also the African school at Parsippany near Newark. Through his exertions in conjunction with Dr. Finley, the American colonization society was formed in 1817, and he was appointed with Dr. Burgess to visit England in behalf of the society, and to explore the west coast of Africa for a suitable site for a colony of colored people from America. He sailed in Nov., 1817, and wonderfully escaped shipwreck on the coast of France. Embarking from England for Africa Feb. 2, 1818, he arrived on the coast Mar. 12. After faithfully exploring it, he embarked for the United States in the brig *Success* May 22, 1818. Having taken a severe cold which was followed by fever, he died at sea June 16. He is called the "father of foreign missions in America." A memoir of him was published by the Rev. Dr. Gardiner Spring.

MILLSTONE. See BUHR-STONE, *ante*.

MILLSTONE GRIT, a species of conglomerate composed of silicious sand and small pebbles. It is named from its frequent use for millstones in England. Its geological position is at the commencement of the coal formation or the terrestial period. The beds along the Appalachian range in Pennsylvania are very coarse and are over 1200 feet thick. The rock here is a light-colored silicious conglomerate, interstratified with some sandstone, and thin beds of carbonaceous shells. In Virginia the beds are sometimes 1000 feet thick, but here it is principally sandstone, containing, however, deep beds of conglomerate. In Alabama the rock becomes quartzose, is of great thickness, and is used there for millstones. Millstone grit also extends into the southern tier of counties in New York, sometimes attaining a thickness of 50 or 60 feet. In Cattaraugus and Alleghany counties it has a cuboidal structure, which in the course of time has had portions worn and washed away leaving large blocks standing alone, and having various shapes which have suggested such names as "Rock city" and "Ruin city." Fossil plants found in the formation are ferns, calamites, lepidodendrons, and sigillaria.

MILLTOWN, a v. in Washington Co., Maine, on the St. Croix river. The chief business is the manufacture and shipment of lumber. It is on the St. Croix and Penobscot railroad, and is a part of the city of Calais.

MILLTOWN, a t. in Charlotte co., New Brunswick, on the St. Croix river, opposite Milltown, Maine. Pop. 2,000. It has 3 churches, a library, and an academy. The principal business is the sawing and shipment of lumber, of which great quantities are

exported. There is also a tool-factory. The St. Croix river is here spanned with several bridges.

MILLVILLE, a city in s. New Jersey, on the West Jersey railroad; pop. '70, 6,101. It is at the head of navigation on the e. bank of the Maurice river 40 m. from Philadelphia and 6 m. s. of Vineland; in a fine agricultural region, with a large local trade. It contains a fine city hall and post-office, 9 churches, a national bank, 4 hotels, and 2 weekly newspapers. Its leading industries are manufactures of lumber, cotton, iron, window glass, and hollow glass-ware. Water and gas pipes are made, and turbine water-wheels; immense wheels for water-works being exported to northern cities. It has excellent public schools.

MILMAN, HENRY HART, D.D., an English poet and ecclesiastical historian, was the youngest son of sir Francis Milman, physician to George III., and was b. in London, Feb. 10, 1791. He was educated at Eton, and afterwards at Brasenose college, Oxford, where he took the degree of M.A., obtained the Newdegate prize in 1812, published *Fazio, a Tragedy* (which was successfully brought upon the stage at Covent garden), in 1815, took orders in 1817, and shortly after was appointed vicar of St. Mary's, Reading. In the following year appeared his *Samor, Lord of the Bright City, an Heroic Poem*, which was followed in 1820 by the *Fall of Jerusalem*, a beautiful dramatic poem, with some fine sacred lyrics interspersed. In 1821 Milman was chosen professor of poetry at Oxford, and published three other poems in the course of the same year—*The Martyr of Antioch, Belshazzar, Anne Boleyn*. His *Sermons at the Bampton Lecture* appeared in 1827, and his *History of the Jews* (3 vols.) in 1829. The last of these works did not bear the author's name; it was written in so liberal and tolerant a spirit that ecclesiastics of the stricter sort could hardly fail to be offended. Its weak point was a want of adequate learning, especially in the department of biblical criticism. A new edition, greatly improved and more critical, yet still far from being very accurate or built on solid foundations, with an interesting preface, was published in 1863. In 1840 appeared a collected edition of his *Poetical Works*, containing some other pieces besides those already mentioned. The same year witnessed the publication of his *History of Christianity from the Birth of Christ to the Abolition of Paganism in the Roman Empire* (3 vols.). In 1849 he was made dean of St. Paul's; and in 1854 published his masterpiece, *History of Latin Christianity, including that of the Popes to the Pontificate of Nicholas V.* (3 vols.). It is a work of great learning, liberality, and chastened eloquence; it displays a broad grasp of human nature in its religious workings; besides a philosophic and poetical sympathy with the different men and opinions which it reviews. The work secured for its author a position in the first rank of English historians. Milman edited Gibbon, and contributed extensively to the *Quarterly Review*. He died in 1868. A posthumous work contains his *Essays on St. Paul, Savonarola, Erasmus*, etc.

MILMORE, MARTIN, b. Mass., 1845; began his studies in sculpture under the direction of Thomas Ball. His first effort which attracted public attention was his modeling of the alto-relief *Phosphor*, an ideal subject, which gained the favor of patrons of art. He produced a statuette of *Devotion*, and was given commissions for an ideal of *Miranda*, and the busts of George Ticknor, Longfellow, gen. Thayer, and Sumner, previous to 1864, and in that year he commenced work on the granite statues surmounting the front of Horticultural hall in Boston, and those of Flora and Pomona, ornamental figures, which were placed in position in 1866. In the following year he designed a bronze statue for the soldiers' monument at Forest Hill cemetery, Boston highlands, and was the sculptor of the army and navy monument on Flagstaff hill, Boston common, 90 ft. in height, erected at a cost of $75,000, dedicated Sept. 17, 1877. On the four sides of the plinth are bronze mezzo-relievos, one representing the departure of troops, one symbolical of the sanitary commission, another the return from the war, and the fourth to commemorate the achievements of the navy, the departure, and the naval engagement. Above this plinth, 9 ft. high, rises a shaft of white Maine granite of the Roman-Doric order, surmounted by a bronze ideal statue of the genius of America. Bronze figures representing peace, history, the army, and the navy stand on the pedestals at the four corners, and about its base are grouped figures in alto-relievo representing the four sections of the union, north, south, east, and west.

MILNE, WILLIAM, D.D., 1780–1822; b. England. In 1813 he visited China under the London missionary society, traveled extensively in China, Malacca, and other islands of the Indian archipelago. In 1815 he went as missionary to Malacca, translated the Scriptures, superintended the publication of religious works and of a monthly magazine, and presided over the Anglo-Chinese college on which Dr. Morrison had bestowed much labor. He also took part in translating the Old Testament into Chinese, and established a quarterly publication entitled *Indo-Chinese Gleaner*. He published *Retrospect of the Protestant Mission to China*.

MILNE-EDWARDS, HENRI, the most eminent living representative of the French school of natural history, was born at Bruges in 1800. His father was an Englishman. Milne-Edwards studied medicine at Paris, where he took his degree of M.D. in 1823, but abandoned medicine to devote himself to natural history. He was first appointed professor of natural history in connection with the Lycée Henri Quatre, and afterwards to the

Museum and the Faculté des Sciences, of which he is now president. In 1838, he was elected a member of the Academy of Sciences (section of Anatomy and Zoology); and in 1854 was chosen a member of the Académie de Médecine. He is also a member of many other societies, French and foreign, and a commander of the Legion of Honor. Milne-Edwards is distinguished for his extensive knowledge of comparative anatomy and physiology well as of zoology. Passing over some of his early works, which, though valuable, are thrown into the shade by his later ones, we come to his *Monograph on the Crustacea* (1837–41), which is universally regarded as of pre-eminent merit, not only for its richness of detail, but also for the value of the general doctrines relating to homologies, development, geographical distribution, and other points of the highest physiological interest. In 1840, an improved edition of his *Elements of Zoology*, a work in 4 vols., and containing 600 illustrations, began to appear. In 1841 he published his researches on the Compound Ascidian Mollusca, which have led to an entirely fresh appreciation of some of the most important points in the history of that group, such as, that *propagation by gemmation*, which had been previously supposed to be a zoophytic character, is equally true of the lower mollusca. In other departments of science, Milne-Edward has been equally successful; but it is to the invertebrate animals that his chief attention has been given, and in each of the three Cuvierian sub-kingdoms, *Articulata*, *Mollusca*, and *Radiata*, his researches have been so important, that what he has accomplished for either alone would suffice to establish for him a high scientific reputation. In 1856 Milne-Edwards obtained the Copley Medal of the Royal society of London. His later works include *Lectures on Physiology*, and on the *Comparative Anatomy of Men and Animals* (1855-57); *History of the Mammalia* (1872, *et seq.*); etc.

MILNER, JOHN, D.D., 1752–1826; b. London; educated at Edgbaston and Douai; took orders, and in 1779 had charge of Winchester chapel. Though a zealous Roman Catholic he refused to join in the attempt in 1788 and 1791, to obtain from parliament the repeal of the laws against the Roman Catholics. He was devoted to the study of archæology, on which he published several works, for which he was admitted in 1790 to the royal antiquarian society. He was engaged in several religious controversies both with Protestant theologians and the Roman Catholic clergy. In 1803 he was appointed vicar-apostolic of the midland district and bishop of Castabala. His chief publications are *History Civil and Ecclesiastical, and Survey of the Antiquities of Winchester*, 2 vols.; *The End of Religious Controversy; Letters to a Prebendary; A Dissertation on the Modern Style of Altering Cathedrals; Treaties on the Ecclesiastical Architecture of England during the Middle Ages; Divine Right of the Episcopacy; Notes on Ireland.* His works are numerous, but none are more highly valued by Roman Catholics than his *End of Controversy* and *Letters to a Prebendary.* He was a man of great learning and acuteness.

MILNER, JOSEPH, an ecclesiastical historian who once occupied a respectable place in literature, was born near the town of Leeds, in Yorkshire, Jan. 2, 1744. He studied at Catharine Hall, Cambridge, where he took the degree of B.A. in 1766, and afterwards became head-master of the grammar-school at Hull. In this capacity, his success was very great. Shortly after, he was appointed lecturer in the principal church of the town, and in 1797, vicar of Holy Trinity church. He died Nov. 15th of the same year. Milner's principal work is his *History of the Church of Christ*, of which he lived to complete 3 vols., reaching to the 13th c. (1794); a fourth volume, reaching to the 16th c., was edited from his MSS. by his brother, DR. ISAAC MILNER, dean of Carlisle, who also published a comple edition of his brother's works in 8 vols., 1810. The principles on which the *History of the Church of Christ* is written are of the narrowest kind; the scholarship is poor, the literary merit still poorer, and the critical insight poorest of all. It deserves mention only for the estimation in which it was formerly held, at a time when the English church seemed sunk in ignorance and stupor.

MILNES, RICHARD MONCKTON, Baron HOUGHTON, English poet and politician, descended from an old Yorkshire family, was born in 1809, and educated at Trinity College, Cambridge. He entered parliament as M.P. for Pontefract in 1837, and continued to represent that borough until the close of the parliamentary session of 1863, when he was called to the upper house by the title of Baron Houghton. In the house of commons he began life as a conservative, but afterwards allied himself to the liberal party, and was a faithful follower of Lord Palmerston, when his foreign policy and high-handed dealings at the foreign office led to the temporary estrangement of that statesman from the whigs. Milnes has distinguished himself, however, rather by his philanthropic labors, and his speeches on behalf of the Italians, Poles, and other oppressed nations, than by his devotion to party politics. He has been the advocate of public education and religious equality. He carried, in 1846, a bill for establishing reformatories, and has taken a great interest in the reform of the criminal classes. Milnes has also cultivated the muses with grace and success. He has traveled much in oriental countries, and is the author of *Memorials of a Tour in Greece*, and also of poems called *Palm Leaves*, in which a poetical halo is thrown around the manners and domestic institutions of the East. His *Poems of Many Years*, and *Poems Historical and Legendary*, contain many simple and elegant effusions. In 1849, he edited the *Life, Letters, and Literary Remains of John Keats.* He has also written *Thoughts on Purity of Election; Monographs. Personal and Social* (1873–76); etc. His *Collected Poetical Works* appeared in 1876.

MILNOR, JAMES, D.D., 1773–1844; b. Philadelphia; studied in the university of Pennsylvania, but without completing the course, entered on the study of law and became a practitioner first at Norristown, Penn., and, from about 1797, in Philadelphia. Having by his marriage forfeited his birth-right in the Society of Friends, he attached himself to the Episcopal church, of which his wife was a member. While practicing law he was prominent in the civil councils of the city and, 1810–13, was one of its representatives in congress. Having, 1812, become a communicant of the church he prepared for the ministry, and, 1814, was ordained as a deacon, and 1815, as a presbyter. He was soon after chosen a minister of the united Episcopal churches in Philadelphia, Christ's church, St. Peter's, and St. James's. From 1816 until his death he was rector of St. George's church in New York city; his active service there being, however, interrupted, 1830, by a visit to Europe as a delegate from the American to the British and Foreign Bible society. He was a man of eminent piety, benevolence, wisdom, and dignity, exerting a great influence through the attractiveness of his Christian character. His published writings were chiefly occasional sermons.

MILO, the ancient Melos, a Greek island in the Cyclades group in the archipelago, about 65 m. e. of the Peloponnesus, in lat. 36° 40′ n., long. 24° 23′ e.; 65 sq.m.; pop. about 3,500. The surface is mountainous, showing traces of volcanic action; and Mt. Calamos is still occasionally active. Mt. St. Elias, in the n.w., the highest point, is 2,338 ft. above the sea level. The soil in the valleys is fertile, and produces wine, corn, oil, fruits, and cotton; but many portions are sterile, and the lowlands uncultivated and malarious. The ancient Melos, of which extensive ruins still exist, was situated on a deep bay in the n. coast. It was a colony of Phenicia, and afterwards of Lacedæmon. During the Peloponnesian war it was captured by the Athenians, who put the adult males to death and enslaved the women and children. The statue "Venus of Milo" was found near Melos, in 1820.

MILO, of Croton, in Magna Græcia (q.v.), an athlete famous for his great strength, who lived, according to Herodotus, in the time of Darius Hystaspes, about 520 B.C. Among other displays of his strength, he is said to have on one occasion carried a live ox upon his shoulders through the stadium of Olympia, and afterwards to have eaten the whole of it in one day; and on another (reversing the story of the Hebrew Samson), to have upheld the pillars of a house in which Pythagoras and his scholars were assembled, so as to give them time to make their escape when the house was falling. He is said to have lost his life through too great confidence in his own strength, when he was getting old, in attempting to split up a tree, which closed upon his hands, and held him fast until he was devoured by wolves.

MILO, TITUS ANNIUS PAPINIANUS, 95–48, B.C., b. Italy; belonged to a distinguished family, and married a daughter of Sylla. Few details of his life are known, till his election as tribune of the people in 57. He was then a partisan of Pompey, and attempted to bring about the recall of Cicero from exile. This measure, which was warmly supported by the Pompeian party was bitterly opposed by Clodius, who, as tribune of the people, had been instrumental in passing the law condemning Cicero to exile. Milo attempted to have Clodius condemned as a violator of the public peace, but the proceedings were quashed. Both Milo and Clodius now hired a body-guard of gladiators, and armed collisions between their retainers became almost every-day occurrences. About this time Milo, who had greatly reduced his fortune by the splendid spectacles which he had displayed to the people during his tribunate, married Sylla's daughter, Fausta, for her fortune. Sallust, the historian, was afterwards discovered in adultery with her, and after being severely handled was allowed to escape with his life only on paying a considerable sum of money to Milo. Meanwhile Cicero had come back, and both he and Pompey were continually attacked by Clodius. The latter was elected curule ædile in 56, and in his turn accused Milo of being a violator of the public peace by keeping a force of armed retainers. Pompey conducted the defense of Milo, but no decision was ever reached. In 53 Milo offered himself as a candidate for the consulship. Clodius opposed the candidature of Milo, who was defended in the senate by Cicero in a speech of which some fragments are still extant. On Jan. 20 of the next year Milo was on his way to Lanuvium from Rome, accompanied by his usual band of armed gladiators. Clodius, also with an armed company, met him near Bovillæ. Milo was dictator of Lanuvium, where he was going to take part in some religious ceremonies, with his wife and a friend, and a number of slaves. Clodius had about 30 slaves with him. Milo and Clodius passed each other without trouble; but some of Milo's followers picked a quarrel with the slaves of Clodius, who attempted to interpose, and was at once stabbed in the shoulder by one of Milo's men. Clodius was taken to a tavern in Bovillæ, but was dragged out by the slaves of Milo and put to death. The corpse of Clodius was placed on the rostra of the forum in Rome, and a great mob set fire to the senate house. These acts of popular violence created a reaction in favor of Milo, who ventured to return to Rome. But the disturbance in Rome soon became so great that Pompey was made subconsul. Milo was tried for the murder of Clodius, and though defended by Cicero, he was condemned to exile. He went to Marseilles, and while there received a revised copy of the speech which Cicero had intended to make in his favor. On reading it, he is said to have remarked that he was glad it had not been delivered, "For if so, I should

not now be eating such fine mullets at Marseilles." In his absence he was tried and condemned on charges of violence, of bribery, and conspiracy. In 48 he went back to Italy without permission, to join Marcus Cælius, an expelled senator, who was attempting to excite a rebellion in s. Italy, and he was killed before a fort near Thurii.

MILREE', MILREI, or MILREA, a Portuguese silver coin and money of account, contains 1000 rees, and is valued at 4s. 8½d. sterling. The coin is commonly known in Portugal as the *corõa*, or "crown," and is (since April 24, 1835) the unit of the money-system in that country. It is used in Brazil. The half-corõa, or half-milrei, of 500 rees, is also used in both countries. The name "milrei" was used in Portuguese accounts long before any coin representing its value existed.

MILTI'ADES, a celebrated Athenian general, "tyrant of the Chersonese," yet, as Byron sings, "freedom's best and bravest friend." Forced by Darius to flee from his dominions, he took refuge at Athens, and on the second Persian invasion of Greece, his military talents being of a high order, he was chosen one of the ten generals. He particularly distinguished himself by the great victory which he gained at Marathon (q.v.) with a small body of Athenians and 1000 Platæans (Sept. 29, 490 B.C.) over the Persian host, under Datis and Artaphernes. By this victory the Greeks were emboldened for the heroic struggle which they made in defense of their country and their liberty. Miltiades being intrusted with the command of an armament for the purpose of retaliating on the Persians, made an attack on the island of Paros in order to gratify a private enmity; but failing in the attempt, he was, on his return to Athens, condemned to pay a heavy fine as an indemnification for the expenses of the expedition. Being unable to do this, he was thrown into prison, where he died of a wound received at Paros. The fine was exacted after his death from his son Cimon (q.v.).

MILTON, a co. in n. central Georgia, drained by the Chattahoochee river, which forms its s. boundary; 150 sq.m.; pop. '80, 6,261—777 colored. The Piedmont Air Line railroad passes near Warsaw in the s.w. part of the county. The surface is rolling and fairly productive; Indian corn, sweet-potatoes, and wheat are the chief products. Chief town, Alpharetta.

MILTON, a t. in e. Massachusetts on the Old Colony railroad; pop. '80, 3,206. It is 7 m. from the old city limits of Boston, which is reached by a horse railway, and is on the Neponset river, which furnishes water-power for several manufactories; among them a paper mill and Baker's chocolate factory. The latter is an old land-mark, standing near the bridge that spans the river, on the opposite bank of which is the Dorchester district of Boston. Country produce is sent to the Boston market, and ice is exported. Leather and rubber goods are manufactured. It has excellent public schools, 3 churches, and many fine large estates, approached by long drives from the turnpike; and from the crest of one of the famous Milton Blue hills, following this fashionable drive, a view of the harbor, Boston light, Deer island, fort Warren, etc., may be obtained. Its roads are celebrated, being made of the dust of Quincy granite taken from ledges in the vicinity. It includes Milton Lower Mills, having 2 churches, a paper mill, and a granite quarry.

MILTON, a t. in Rock co., Wis., the post village of which is 62 m. by rail s.w. of Milwaukee, at the junction of the Monroe branch of the Milwaukee and St. Paul railroad with the Prairie du Chien division; pop. '70, 2,010. Milton college, established in 1867 by the Seventh-Day Baptists, is its chief institution.

MILTON, JOHN, an Engli h poet, was b. in Bread street, London, on Dec. 9, 1608. His father was of an ancient Catholic family, but was disinherited on becoming Protestant. He followed the occupation of a scrivener, by which, according to Aubrey, "he got a plentiful estate," and was a man of great musical accomplishment, being the composer, among other things, of the two well-known psalm-tunes *Norwich* and *York*. From him his son derived his matchless ear, and that strict integrity of character for which he is as famous as for his verse.

Milton was carefully nurtured and educated. He was first placed under the care of a private tutor named Young, a Scotchman by birth and education; and at the age of 12, was sent to St. Paul's school, London, and afterwards to Christ's college, Cambridge. According to the university register, he was admitted Feb. 12, 1624–25. He took his degree of M.A.; and having relinquished the idea of following divinity or law, he left Cambridge in 1632, and went to live at his father's house at Horton, in Buckinghamshire. There, in serenity of mind and passion, he lived five years, reading the Greek and Latin poets, and composing *Comus*, *Lycidas*, *Arcades*, *L'Allegro*, and *Il Penseroso*. On the death of his mother in 1637, he went abroad, visiting the chief Italian cities, and making the acquaintance of Grotius and Galileo. While traveling, being made aware that clouds were gathering in the political atmosphere at home, he returned in 1639, and engaged himself with the tuition of his nephews—on which portion of Milton's life, Dr. Johnson could not help looking with "some degree of merriment." In 1641 he engaged in the controversies of the times, and in the course of that and the following year he issued the treatises *Of Reformation*, *The Reason of Church Government urged against Prelacy*, *Prelatical Episcopacy*, and *An Apology for Smectymnuus*. In 1643 he married rather suddenly Mary, daughter of Richard Powell, an Oxfordshire royalist, but the union did

not at first prove happy. His wife, who had been accustomed to "dance with the king's officers at home," found her husband's society too austere and philosophic for her gay tastes. After the severe honeymoon was over, she obtained permission to visit her relatives till Michaelmas; but when Michaelmas came, she refused to return. Stern and proud, Milton repudiated her at once; and the matrimonial disagreement made the world the richer by four *Treatises on Divorce*. A reconciliation, however, took place, which, we have no reason to doubt, was both genuine and permanent. Mary Powell died in 1652–53, leaving him three daughters, Ann, Mary, and Deborah, of whose undutifulness and ingratitude we have latterly many complaints. In 1644 he produced his *Tractate on Education* and his *Areopagitica*—a flame of eloquence at which one may warm one's hands yet. After the execution of Charles, he was appointed Latin secretary to the council of state, with a salary of £290. In his new position his pen was as terrible as Cromwell's sword. In *Eikonoklastes* he made a savage but effective reply to the famous *Eikon Basilike;* and in his *Pro Populo Anglicano Defensio* he assailed his opponent, Claude de Saumaire, better known as *Salmasius*, with such a storm of eloquence and abuse that the latter, who died at Spa in 1653, is believed to have lost his life through chagrin. Milton at least flattered himself with having "killed his man." His second wife, whom he married Nov. 12, 1656, was a daughter of capt. Woodcock of Hackney. She died in childbed in Feb., 1658, and her husband has enshrined her memory in an exquisitely pure and tender sonnet.

Unceasing study had affected his eyesight, and about 1654 Milton became totally blind. After the restoration, he retired from affairs; he was obnoxious to the reigning power, and it is said that he was once in custody of the sergeant-at-arms. On the publication of the act of oblivion, he married his third wife, Elizabeth Minshull, and shortly after removed to a house in Artillery walk, when he was busy with *Paradise Lost*. This great poem was originally planned as a mystery; then some idea of treating it as a drama haunted the author's mind; finally, however, he resolved to write an epic poem on the Fall of Man. The poem was published in 1667. He received five pounds from his publisher, and a promise of other five pounds when 1300 copies should have been sold. In 1670 he published his *History of England*. Next year he printed *Paradise Regained* and *Samson Agonistes*. He died on Sunday, Nov. 8, 1674, and was buried next his father, in the chancel of St. Giles, at Cripplegate. He left property to the value of £1500.

Milton was, above all English poets, stately and grandiose. He arrived early at the knowledge of his powers, and did not scruple, in one of his prose tracts, to inform his readers that he proposed to write a poem which would be considered one of the glories of his country. Drawn away for a time by the heats of controversy and by official tasks, he never forgot his pledge, and redeemed it at last in old age, blindness, and neglect. In comparison, other poets are like sailing-ships, at the mercy of the winds of passion and circumstance; he resembled the ocean-steamer, which, by dint of internal energy, can pierce right through the hurricane. Never, perhaps, was a mind more richly furnished. His careless "largess" is greater than the fortunes of other men. His *Comus* is the very morning-light of poetry; while in his great epic there is a massiveness of thought, a sublimity of imagery, a pomp of sound—as of rolling organs and the outbursting of cathedral choirs—which can be found nowhere else. His great passages echo in the mind as if loath to die. Of all great writers, he is perhaps the one for whom we are conscious of the least personal affection, and this arises from a certain hauteur and severity which awes—which repels some natures; yet he infects his reader with his own seriousness. See Pattison's short life (1879); Stern's *Milton u. seine Zeit* (1878); and Masson's *Life and Times of Milton*, 6 vols. (1858–80).

MILUTIN, or MILYUTIN, Nikolai Alexeyevitch, 1818–72; b. Russia; educated at the lyceum of Moscow, graduating in 1835, at the expense of the czar Nicholas, who gave him a free scholarship at the university of St. Petersburg, where he finished his studies in 1838. In 1844 he was appointed chief of the press bureau, but left it to revise the Russian municipal laws. He was appointed by the czar on a committee concerning the serfs, and afterwards was under-secretary of the interior. When Alexander II. came to the throne in 1855, he was his confidential adviser. He countersigned the ukase of emancipation, Mar. 3, 1861, and prepared the laws required by that act. He was made secretary of the interior, and to him are due in Russia the criminal code, the press law, and trial by jury.

MILWAU'KEE, a co. in s.e. Wisconsin, having lake Michigan for its e. boundary; 240 sq.m.; pop. '80, 138,523—83,469 of American birth, 319 colored. It is traversed by the Chicago, Milwaukee and St. Paul railroad, the Chicago and Northwestern, Detroit, Grand Haven and Milwaukee, the Milwaukee, Lake Shore and Western, the Western Union, and the Wisconsin Central. It is drained by the Menomonee, Root, and Milwaukee rivers. Its surface is hilly, and the soil is very fertile, having a lower stratum of limestone. It produces grain and dairy products, and is adapted to stock-raising. It has manufactures of lumber and wool, machine shops, rolling mills, basket factories, etc. The Milwaukee river furnishes extensive water-power. Wheat is largely exported, and steamers cross the lake in every direction laden with its products and merchandise.

MILWAUKEE, a city of Wisconsin, on the western shore of lake Michigan, at the mouth of Milwaukee river or creek, which forms its harbor. The town, beautifully built with light yellow bricks, crowns a high bluff on the lake, and contains county buildings, custom-house, and post-office, 60 churches, public schools, female college, banks, insurance companies, asylums, hospital, and many daily and weekly papers. Several railways connect the city with a country of great fertility. In extent of marine commerce, Milwaukee ranks fourth among the cities of the union; and it has great advantages as a manufacturing center. The grain received at Milwaukee in 1873 amounted to 33,983,315 bushels. Pop. '60, 45,254; '70, 71,440.

MILWAUKEE (*ante*), the 19th city in population of the United States; pop. '80, 115,578. Lat. 43° 3′ 45″ n.; long. 87° 57′ w. It is 90 m. n. of Chicago, and 80 m. e. of Madison, on the Milwaukee, which flows into the lake from the n. and is navigable for 2 m. from its mouth. The Menomonee discharges into the Milwaukee about ½ m. from the mouth of the latter. The city harbor is 6 m. long and 3 m. wide, and has been extensively improved by the government, so as to be one of the best harbors on the lakes. The city lies on both sides of the river. Its streets are regular, and the architecture has a pleasing appearance, the most common building material being the cream-colored brick manufactured in the city. The business part of the city is in its center, near the rivers; the higher parts to the e. and w. are occupied by residences. The streets are lighted with gas, and well-paved, and there is a good sewage system. The county court-house is an elegant sandstone building, erected at a cost of over $400,000; the U. S. courts are held in the marble post-office, which is also used for a custom-house. The county jail and workhouse are here. There are 25 public and 50 private schools, a number of academies, an industrial school, 4 orphan asylums, and 2 hospitals. There is a college for women in the city, and a Franciscan college and Capuchin monastery in the suburbs. There is a public art gallery, a public library connected with the young men's association, and a German library and museum. There are 3 theaters, and 47 periodicals, of which 20 are in German; 7 are dailies. The city has 71 churches, a Roman Catholic and an Episcopal cathedral. The former is the seat of the archbishop. Milwaukee is the terminus of 6 railroads: the Chicago and Northwestern; Wisconsin Central; Western Union; Milwaukee, Lake Shore and Western; Detroit and Milwaukee; and Chicago, Milwaukee and St. Paul. It is the greatest wheat market in the world, and the port from which are shipped the agricultural products of the three great states of Wisconsin, Minnesota, and Iowa. The receipts of wheat in 1877 were 19,355,469 bush.; of flour, 1,905,454 bbls.; of oats, 1,550,263 bush.; of corn, 935,739 bush.; of barley, 2,444,454 bush.; of butter, 8,898,875 lbs.; of wool, 2,528,843 lbs.; of cheese, 8,289,701 lbs. The shipments of wheat for the same year were 18,204,253 bush., and of flour 2,286,786 bbls. There is storage for 6,000,000 bush. Another article of extensive export is lumber, of which 136,429,000 ft. were shipped in 1877, besides 177,189,000 shingles. The Milwaukee river furnishes an abundant water-power for manufacturing purposes. A dam 3 m. from its mouth brings the water up 12 ft. above high-water mark, and a canal 1¼ m. long, runs from this dam along the w. side of the river. Manufactories and mills are built along the canal, and their wares can be loaded directly into steamers without another transfer. The most important manufacturing establishments are the iron and rolling mills, with a capital of nearly $4,000,000, and employing over 2,000 men. There are 13 flouring mills with a capital of over $1,500,000. Over $3,000,000 is invested in the manufacture of beer, and $1,300,000 in the manufacture of leather. Large amounts are invested in the pork-packing business. Among the smaller manufactures are woolen cloth, boots and shoes, sashes and blinds, wagons, barrels, brooms, furniture, tobacco and cigars, soap and candles, paper, and white lead. There are 14 banks, and a number of insurance companies. The national asylum for invalid soldiers is about 3 m. from the city. It is a government institution, and contains some 600 soldiers. A line of steamers runs across the lake, connecting with the Detroit and Milwaukee railroad. The tonnage of vessels belonging to Milwaukee is nearly 70,000. Milwaukee has a very large German population, and many Scandinavians and Bohemians are settled there. It is divided into 13 wards, each of which elects 1 alderman and 2 common councilmen. The city is furnished with water from the lake. Its first white settler was a Frenchman named Jumeau, who came there in 1825 to engage in the fur-trade, and was afterward mayor. It was incorporated as a city in 1846.

MÎMÂNSA (from the Sanskrit *mân*, to investigate; hence, literally investigation) is the collective name of two of the six divisions of orthodox Hindu philosophy. See SANSKRIT LITERATURE. It is distinguished as *Pûrva-* and *Uttara-mîmânsâ*, the latter being more commonly called *Vedânta* (q.v.), while the former is briefly styled *Mîmânsâ*. Though the Mîmânsâ is ranked, by all native writers, with the five other philosophical systems, the term philosophy—as understood in a European sense—can scarcely be applied to it; for the Mîmânsâ is neither concerned with the nature of the absolute or of the human mind, nor with the various categories of existence in general—topics dealt with more or less by the other five philosophies; its object is merely to lay down a correct interpretation of such Vedic passages as refer to the Brâhmanic ritual, to solve doubts wherever they may exist on matters concerning sacrificial acts, and to reconcile discrepancies—according to the Mîmânsâ, always apparent only—of Vedic texts. The foundation of this system is

therefore preceded by a codification of the three principal Vedas—the Rik, Black-Yajus, and Sâman—and by the existence of schools and theories which, by their different interpretations of the Vedic rites, had begun to endanger, or, in reality, had endangered a correct, or at least authoritative understanding of the Vedic texts. It is the method, however, adopted by the Mîmânsâ which imparted to it a higher character than that of a mere commentary, and allowed it to be looked upon as a philosophy; for, in the first place, the topics explained by this system do not follow the order in which they occur in the Vedic writings, especially in the Brâhmana portion of the Vedas (q.v.); they are arranged according to certain categories, such as authoritativeness, indirect precept, concurrent efficacy, co-ordinate effect, etc.; and secondly, each topic or case is discussed according to a regular scheme, which comprises the proposition of the subject-matter, the doubt or question arising upon it, the *primâ-facie* or wrong argument applied to it, the correct argument in refutation of the latter, and the conclusion devolving from it. Some subjects treated of in the Mîmânsâ, incidentally as it were, and merely for the sake of argument, belong likewise more to the sphere of philosophic thought than to that of commentatorial criticism, such, for instance, as the association of articulate sound with sense, the similarity of words in different languages, the inspiration or eternity of the Veda, the invisible or spiritual operation of pious acts, etc. The reputed founder of this system is Jaimini—of unknown date—who taught it in twelve books, each subdivided into four chapters, except the third, sixth, and tenth books, which contain eight chapters each; the chapters, again, are divided into sections, generally comprising several Sûtras or aphorisms, but sometimes only one. The extant commentary on this obscure work is the *Bhâshya* of Sabaraswâmin, which was critically annotated by the great Mîmânsâ authority, Kumârila-swâmin. Out of these works, which, in their turn, quote several others, apparently lost, has arisen a great number of other writings, explaining and elucidating their predecessors. The best compendium amongst these modern works is the *Jaiminîya-nyâya-mâlâ-vistura*, by the celebrated Mâdhavâchârya (q.v.).

MIMES, the name given by the ancients to certain dramatic performances, in which, with little attempt at art, scenes of actual life were represented, sometimes in improvised dialogue. The Greek mimes appear to have been invented by the Greeks of Sicily and southern Italy. They were a favorite amusement of convivial parties, the guests themselves being generally the performers. Sophron of Syracuse, about 420 B.C., composed many in the Doric dialect, which were much admired, and which Plato was accustomed to read.—The Roman mimes were not borrowed from the Greek, but were of native Italic growth. They were not only far ruder and coarser, but in some respects they were essentially different—the dialogue occupying a smaller place, and mere gesture and mimicry predominating. The humor and satire, however, were often genuine, though rough, and even indecent, and they were greatly relished by all classes; even the patrician Sulla was fond of them.

MIMNER'MUS, B.C. about 635–600; b. probably at Colophon or Smyrna, but little is known of his life except as disclosed in his poems. As an elegiac poet he is spoken of by ancient critics with great admiration, but of his work only a few fragments remain. These are partly erotic, and in part treat of such subjects as the short-livedness of pleasure, fleeting youth, etc.; and all his topics are tinged with melancholy. He was the first to adapt the elegiac verse to this kind of composition. The best of his existing poems is *Nanno*, a love song to a young musician.

MIMO'SEÆ, a suborder of *leguminosæ*, one of the largest natural orders of exogenous plants; distinguished by regular flowers and petals valvate in bud. About 1000 species are known, all natives of warm climates, a few only extending beyond sub-tropical regions in the southern hemisphere. The genera *acacia* (q.v.) and *mimosa* are the best-known. To the latter genus belongs the sensitive plants (q.v.). Some of the larger species of mimoseæ are valuable timber trees. The TALHA (*mimosa ferruginea*) is one of the most common trees of central Africa. They are also trees of great beauty. Some species of the genus *prosopis*, natives of the western parts of South America, are remarkable for the abundance of tannin in their pods.

MIM'ULUS, a genus of plants of the natural order *scrophulariaceæ*, having a prismatic 5-toothed calyx, a somewhat bell-shaped corolla, of which the upper lip is bifid and the lower trifid, the lobes not very unequal, two long and two short stamens, and a stigma of two lamellæ, which close together upon irritation. The species are mostly herbaceous plants, natives of America. Some of them are very frequent in flower-gardens, and many fine varieties have resulted from cultivation. They sometimes receive the name of *monkey-flower*. One species, *M. luteus*, a native of Peru and Chili, has become naturalized in many parts of Britain. The little yellow-flowered MUSK PLANT, now so common in gardens and on window-sills in Britain, is *M. moschatus*, a native of Oregon and other north-western parts of America.

MI'NA, or **MNA,** the name of a Greek weight and money denomination, derived from an oriental word, *maneh*, signifying "weight." The mina contained 100 drachmæ (q.v.), and was the sixtieth part of a talent; consequently, as a *weight*, it was equivalent to about 1¼ of a pound avoirdupois, varying in different districts to the extent of one-

third of a pound more or less, following the fluctuations of the talent itself. As a *money of account*, it preserved the same relation to the talent, and was worth £4 1s 3d. See TALENT.

MINA, Don FRANCISCO ESPOZ Y., 1782–1836; b. Spain; first distinguished himself in 1809 by guerrilla warfare, organizing bands of mountaineers in Catalonia to repel the French invaders. In 1810 he became commander-in-chief of the Catalonian army, and noted for his incessant activity and remarkable presence of mind. In 1812 he was made commander in Aragon, with the rank of general, and assisted in gaining the victories of Salamanca and Vittoria, and conducted an efficient blockade of Pampeluna. Discovering, when peace was made, in 1814, that he had been laboring in the interest of the despotic policy of Ferdinand III., he made an ineffectual attempt to gain over the garrison of Pampeluna to the cause of freedom, and then sought an asylum in France. While resident in Paris he was arrested by a French commissary of police, employed by the Spanish ambassador. On this occasion Louis XVIII. acted with great magnanimity. He dismissed the commissary, demanded the recall of the Spanish ambassador, and not only released Mina but gave him a pension of 1000 francs. In 1822, when the army of Cadiz proclaimed the constitution of 1812, and began a new revolution, gen. Mina repaired to Navarre, where he learned that the king had accepted the new constitution, and accordingly ceased an aggressive movement which he had already undertaken. He was appointed capt.gen. of the armies of Navarre, Catalonia, and Aragon; but on Ferdinand recanting his assurance of adherence to the constitution, he again retired from Spain, and went to England. After the accession of Isabella II., under the regency of queen Christina, he became prominent in the operations against don Carlos; and on these ending, the charge of educating the young queen was allotted to gen. Mina and his wife.

MINA, XAVIER, 1789–1816; b. Spain; nephew of Francisco; educated for the priesthood. He was with his uncle in the guerrilla warfare of 1808–09, was taken prisoner in 1810, and detained four years at Vincennes. In 1814 he was again in arms, and forced to flee to France. Thence he went to England, where he interested himself in the cause of Mexican patriots struggling for independence, and by the aid of some prominent Englishmen chartered a vessel, purchased arms, organized an expedition, and sailed for America, arriving on the coast of Virginia in the summer of 1816, with his party. In the United States he received sympathy and substantial support, and took 200 volunteers with him, arriving at Galveston in November, but soon afterwards crossing over to New Orleans obtained more assistance, and after being reinforced by 100 Americans at Galveston, landed at Soto la Marina, province of Tamaulipas, April, 1817. He now marched at the head of 500 men towards the capital, fighting his way through such bodies of Spaniards as he met. He was successful in a number of engagements, but was at length surprised at night, captured, and put to death in front of the fortress of Remedios, Oct. 27, 1817.

MINA BIRD, *Eulabes Indicus* or *Gracula Indica*, a species of grakle (q.v.), or of a nearly allied genus, a native of many parts of the East Indies, about the size of a common thrush, of a deep velvety black color, with a white mark on the base of the quill-feathers of the wings, yellow bill and feet, and two large bright yellow wattles at the back of the head. The bill is large, conical; the upper mandible a little curved and sharp-pointed. The food of the mina bird consists of fruits and insects. It is very lively and intelligent, and possesses a power of imitating human speech excelled by none of the parrots. It has sometimes been trained to repeat sentences of considerable length. It is therefore in great request, and is often brought to Europe.—Another and larger species is found in Sumatra and some of the other eastern islands; possessing the same power of articulation. It is highly prized by the Javanese.

MINAMOTO, or GEN, the name of an ancient noble family in Japan, whose members for many centuries were military vassals of the mikados. Under the leadership of the Minamoto generals the whole of eastern and northern Japan, above the 36th parallel n. lat. was conquered, and the aboriginal tribes brought under the government of the imperial court at Kioto, and the brocade banner of the mikado was borne even into Yezo. The Minamoto family was founded by two grandsons of the 57th mikado, Seiwa, who reigned 859–76. From these princes, in two branches, have descended the hundreds of illustrious military characters whose names and exploits fill the annals of Japan. Among their living descendants are seventeen families of nobles of the imperial court, of whom are Iwakura, now premier, Ohara, Higashi, Kuze, and other prominent rulers. Their crest consists of three bamboo leaves surmounted by gentian flowers. See YORITOMO.

MINARET,—MINAR, a tall turret, used in Saracenic architecture. It contains a staircase, and is divided into several stories, with balconies from which the priests summon the Mohammedans to prayer—bells not being permitted in their religion—and is terminated with a spire or ornamental finial. The minarets are amongst the most beautiful features of Mohammedan architecture, and are an invariable accompaniment of the mosques (q.v.). In India, *minars*, or pillars of victory, are frequently erected in connection with mosques; some of these are lofty and splendid monuments, that of Kootub, at Old Delhi,

being 48 feet 4 in. in diameter at base, and about 250 feet high. They are often built on a plan of a star-like form, and are divided into stories by projecting balconies, like the minarets.

MINAS GERAES, an interior province in e. Brazil, bounded on the n. by Bahia, on the e. by Porto Seguro and Espiritu Santo, on the s. by Rio Janeiro and Sâo Paulo, and on the w. by Goyaz, 237,481 sq.m.; pop. '72, 2,039,735. It is an elevated table-land, intersected by many mountain chains, which send out offshoots in all directions. The highest peaks are Itambi, 5,950, and Itacolumi, 5,750 ft. above the level of the sea. Between the mountain ridges are sloping and well-watered valleys. There is an abundance of small streams, which flow into the Sâo Francisco, or the tributaries of the Parana. The Sâo Francisco rises in the s. of the province, flows through almost its entire length, forms the boundary line between Bahia and Pernambuco, and between Sergipe del Rei and Alagoas, and finally falls into the Atlantic ocean. The Doce and the Jequitinonha flow e. to the Atlantic, and the Rio Grande and Rio Parnahiba unite to form the Parano. Other rivers of importance are the Verde Grande, Paranahyba, Rio das Velhas, and Mucury. On account of its elevation the climate is much milder than that of districts within the same parallels of latitude. The soil is fertile, and produces the ordinary cereals of the temperate zones, besides the crops characteristic of a warmer climate, such as tobacco, cotton, sugar, coffee, and indigo. Ipecacuanha, manioc, and jalap are produced largely. The productions of the country are exported to the neighboring provinces, from which imports of wine, salt, and flour are made. The valleys between the mountains are used for grazing purposes, and cattle are raised in large numbers. The mines were formerly among the richest in Brazil, yielding large quantities of gold, but they are for the most part abandoned, though gold is still found in paying quantities. Diamonds were discovered in the province in 1746, and diamond-washing is extensively pursued. Other varieties of precious stones are found in the rivers. The mineral deposits are extensive, including, besides gold and silver, iron, lead, mercury, bismuth, antimony, alum, and sulphur. The want of railroads makes transportation, which is dependent on mules, difficult and expensive. Cotton and woolen manufactories, foundries, and other manufacturing industries have been introduced. Capital, Ouro Preto.

MINATITLAN, a t. on the isthmus of Tehuantepec, Mexico, 125 m. s.e. of Vera Cruz, on the w. side of the Coalzacoalcos. It is in a flat country, and is often exposed to floods. Mahogony grows in the region, and considerable is exported. This t. is the proposed terminus of the Tehuantepec ship canal and railroad.

MINCH, the channel which separates the island of Lewes from the counties of Cromarty and Ross, in the n.w. of Scotland. Its shores are exceedingly irregular, and its average width is about 28 miles. The *Little Minch*, which separates the island of Skye from that of North Uist and the neighboring islands in the outer Hebrides, is upwards of 15 m. in width.

MINCIO (anc. *Mincius*), a river of n. Italy, a continuation of the Tyrolese stream, the Sarca, emerges from lake Garda at Peschiera, and after a course of about 38 m. through the province of Mantua, which it separates from Verona, falls into the Po, 8 m. below the city of Mautua. The Mincio has constituted an important basis of operation during the wars between Italy and Austria.

MIND. Having adverted in various other articles—EMOTION, INTELLECT, WILL, etc.—to the chief component parts of our mental constitution, all that is necessary under the present head is to consider the definition or precise demarkation of mind as a whole. In this subject we cannot resort to the common method of defining, which is to assign something more simple and fundamental than the thing to be defined; as when we define gravity to be an *attractive force*, the notions of force and attraction being supposed to be more intelligible than gravity. Mind can be resolved into nothing more fundamental than itself; and therefore our plan must be to call attention to those individual facts or experiences that are pointed at by the name, and to circumscribe, in some way or other, the whole field of such experiences. For an example of mind, we should probably refer each person to his pleasures and pains, which are a class of things quite apart and peculiar; we should also indicate thoughts or ideas as mental elements; also exercises of will or voluntary action. There is a sufficient community of nature in those various elements to cause them to be classed by themselves under a common designation, namely, mind. If any one could be made aware of all the phenomena that have received this designation, he would, of course, know the meaning in the detail; but this is not enough. Mind being a general or comprehensive name, we ought to see distinctly the common character or attribute pervading all those particular phenomena; the recognition of this common character is the knowledge of mind in general, or the determination of its defining attribute. For the settling of this common attribute we have another great resource, besides comparing the individual facts, that is, to determine the opposite, or contrast of mind. Now, the usually assigned contrast is matter; but more precisely, it is extension, or *the extended*, including both inert matter and empty space. When we are conscious of anything as having the property of extension, our consciousness is occupied with the object world, or something that is not mind. When we are feeling pleasure or pain, remembering or willing, we are not conscious of anything extended; we are said to be

in a state of subjective consciousness, or to be exhibiting a phenomenon of mind proper. Hence, philosophers are accustomed to speak of the *inextended mind*, as distinguished from the outer or object world. In one sense everything that we can take cognizance of is mind or self; we cannot by any possibility transcend our own mental sphere; whatever we know is our own mind; hence the idealism of Berkeley, which seemed to annihilate the whole external universe. But this large sense of mind is not what is usually meant, and whatever view we take of the reality of the external world, we must never merge the distinction between the consciousness of the extended—which is also coupled with other truly object properties, as inertia, for matter—and the consciousness of the inextended, as constituting our feelings and thoughts. This opposition is fundamental and inerasable, and is expressed in language by a variety of designations—mind and not mind, subject and object, internal and external. The laws and phenomena of the extended are set forth in the sciences of the external world—mathematics, mechanics, chemistry, etc.; the laws of the mind proper, or the subject consciousness, are quite distinct in their nature, and are embodied in a separate science, called mental philosophy, psychology, etc.

MIND, GOTTFRIED, 1768–1814, b. Switzerland; educated at Pestalozzi's charity school. His education, however, except in the art of design, was extremely limited. He was naturally eccentric, and a deformity to which he was subject increased his peculiarities, and made him avoid society. He was fond of cats, his pictures of which are his most characteristic works. He was also successful in the delineation of children and beggars. He died poor, but some of his pictures have since been sold at very high rates.

MINDANA'O. See PHILIPPINE ISLANDS.

MINDEN, a Prussian t. in the province of Westphalia, lies on the Weser, is a prosperous, closely-built city, with a population of (1875) 17,088. It was till lately a fortress of the second class. Minden, which ranks as one of the oldest towns in Germany, has a stone bridge across the river, originally erected in 1518, and possesses several ancient churches, the most noteworthy of which is the present Roman Catholic church. Built in the second half of the 11th c. it was till 1811 an episcopal cathedral. A battle was fought near Minden in 1759, in which the French were defeated by an army of Anglo-Hanoverian troops.

The Hanoverian town of Minden or *Münden* is situated in the district of Hildesheim, within the province of Göttingen, and at the confluence of the Fulda and Werra. Pop. 75, 5,616. Minden lies in one of the most picturesque and fruitful parts of Hanover. It has 3 breweries, and manufactories of china, earthenware, sugar, tobacco, and linen, with a noted linen-market. There are alum-works and good coal-mines in the immediate neighborhood; and it has an extensive river transport-trade in millstones, corn, and timber. Minden possesses several architectural remains, indicative of its former more prosperous condition.

MINDORO. See PHILIPPINE ISLANDS, *ante.*

MIN'DSZENT, a t. of Hungary, in the county of Csongrad, near the left bank of the Theiss, and just below the mouth of the Saros, 19 m. north from Szegedin. Pop. '69, 9,414.

MINE. See MINES; MINING; *ante.*

MINE'O, a t. of the island of Sicily, in the province of Catania, 82 m. s.w. of Messina. It is supposed to occupy the site of the ancient *Menæ*, founded by Ducetius, 459 B.C. Pop. 9,500.

MINER, a co. in s.e. Dakota, drained by Sand Hill creek and Marsh creek, affluents of the Dakota river; about 504 sq. m.; pop. '80, 363–299 of American birth. It is principally slightly undulating prairie land, little cultivated, but with a soil of exceptional fertility.

MINER, ALONZO AMES, D.D., b. N. H. 1814; principal of the military and scientific academy at Unity, New Hampshire, 1835–39. In the latter year, he was ordained to the Universalist ministry. He has been pastor of Universalist churches at Methuen, Lowell, and Boston, an overseer of Harvard college, a member of the Massachusetts board of education, and president of Tuft's college, Medford, from 1862 to 1874, when he re-assumed the pastorate of the second Universalist church, Boston. He is an advocate of total abstinence, and has been the candidate of the "prohibitory" party for governor of Massachusetts. He was was also prominent in the antislavery agitation.

MINER, THOMAS, 1778–1841; b. Conn.; a graduate of Yale, and a physician who gained some distinction in his profession by the publication in 1825 of *Essays upon Yellow Fevers and other Medical Subjects* and a treatise on *Typhus Syncopalis.* He was also one of the founders of the Yale medical institute, and the Connecticut retreat for the insane. His autobiography was published in the *New Englander*, vol. ii.

MINERAL, a co. in n.e. West Virginia, having the n. branch of the Potomac river, the Baltimore and Ohio railroad, and a ridge of the Alleghany mts. for its w., n., and n.e. boundaries, separating it from the state of Maryland; 280 sq. m.; pop. '80, 8,629–8,170 of American birth, 486 colored. Its surface is mountainous with wide fertile valleys,

and is drained by Patterson's creek. The soil is adapted to the cultivation of grain and potatoes; its dairy products are considerable, and live stock is raised. Iron and bituminous coal are mined, and largely exported. The Chesapeake and Ohio canal follows the course of the river and the railroad on its n.e. border, and the Cumberland and Pennsylvania railroad terminates at Piedmont. Capital, Keyser.

MINERAL ACIDS, in medicine. The ordinary mineral acids are sulphuric (oil of vitriol), nitric (aqua fortis), hydrochloric (muriatic acid), phosphoric, chromic, and carbonic acids. Of these the latter only is usually regarded as a gas, that being its ordinary condition, but all the others are gases or vapors at certain temperatures, except phosphoric and chromic which on being heated change in composition. Concentrated sulphuric acid boils (in other words becomes a vapor) at 620° F., and concentrated nitric at 184° F. Hydrochloric acid is a solution of a gas in water, and has constantly varying degrees of strength. An aqueous solution boiling at 230° F. gives off a vapor which contains 20.22 per cent of anhydrous acid gas dissolved in 79.78 per cent of water, which may be condensed in a receiver. A more concentrated solution when heated yields at first only gas; as it gets weaker by parting with the gas, water begins to pass off along with it. These acids have various uses in medicine. Sulphuric, nitric, chromic, and hydrochloric acids in a concentrated state are powerfully corrosive, and on this account nitric acid is used in surgery as an escharotic, to destroy warts and other excrescences or diseased growths or unhealthy tissues. It has the property of only injuring the tissue as far as it destroys it, leaving a wound which heals easily. Sulphuric acid, on the contrary, produces an inflammation which does not readily subside, while hydrochloric acid used as an escharotic produces sloughing, sometimes of a dangerous character. Chromic acid which is ordinarily a crystalline solid of a beautiful crimson color is soluble in water, and its solution, of a proper strength, is also used as an escharotic in surgery, and is generally preferred to nitric acid, being rather more manageable. It is also used, in weaker solutions, as an application to the gums in scrofulous patients, when there is a tendency to ulceration, and in other ill-conditioned states of the system, and also as a styptic for arresting surface hemorrhage. It is not administered internally. Sulphuric acid in a diluted form is sometimes employed as a tonic, and its various salts are many of them valuable medicines. See sulphates in SULPHURIC ACID, *ante*. Dilute nitric acid is given as a medicine in several affections. It sometimes succeeds in intermittent fever when quinine is contra-indicated, and has been given in dysentery, on the recommendation of Hope. In some forms of dyspepsia and mal-assimilation it is useful in assisting digestion and improving nutrition. In combination with hydrochloric acid, in the form of diluted aqua-regia, it is often successfully used in cases of jaundice, and also in some forms of dyspepsia, hydrochloric acid being a natural ingredient of the gastric juice. Dilute nitric acid has been used with benefit in diabetes mellitus, and it is stated that in large doses, largely diluted in water, it has cured several cases of diabetes insipidus. It has also been successfully used in scrofula and glandular enlargements. See CARBONIC ACID, NITRIC ACID, HYDROCHLORIC ACID, and phosphoric acid in PHOSPHORUS.

MINERAL CHAMELEON. See MANGANESE.

MINERAL DEPOSITS. This term is generally understood as a collection of metalliferous ores occurring in geological formations where they have been deposited by the processes of nature, and have, with some exceptions, undergone more or less alteration, either in composition or position, by subsequent changes. Sometimes the ore is a native metal, but is more frequently a mixture of compounds of different metals. A single metal may be the principal one, the associated metals forming a mixture which is called a gangue, the principal ore and the gangue constituting the deposit. In general, ores may be classified as follows: compact, when the structure is close and fine-grained; granular, when composed of visible particles; micaceous or finely laminated, when existing in the form of minute scales, as, for example, micaceous specular iron ore; disseminated, when scattered throughout the gangue in laminæ or coarse grains; porphyritic, when distributed in distinct crystals; banded, when the principal ore, or the gangue, or both, are arranged in parallel layers, or bands. Sometimes the bands are arranged concentrically, when the deposit is said to be concentric-banded; brecciated, when the deposit contains fragments of other rock or of older ore, these fragments often forming nuclei around which the ore or the gangue has formed further deposits or crystals; and it is called drusy when there are many cavities lined with crystals. Mineral deposits may also be divided into superficial, stratified, and unstratified deposits. Superficial deposits are those in which the materials lie in a more or less unconsolidated or loose condition where they have been washed from cliffs and mountain slopes whose rocks contained metals, ores, or gems. The surface gold deposits of California, Australia, and the Ural are examples, as also the platinum beds of Oregon and Siberia, and the stream tin of Cornwall, Australia, and Durango, and the diamond, sapphire, and ruby "mines" of Brazil, South Africa, and the Indies. The ease with which such deposits are worked renders them as a rule the most profitable when first discovered. Stratified deposits have their examples in the coal beds, and many beds of iron, such as the clay iron-stone of the coal measures; and the schistose copper beds in the triassic sandstones of New Mexico. Unstratified deposits have their examples in those meta-

morphosed rocks which have been much disturbed by geologic forces, as the iron ores of Missouri, lake Superior, and the Alleghanies. These deposits were formerly supposed to be of eruptive origin, but it is now understood that they are principally stratified deposits which have been subjected to great disturbance and to metamorphism. The vast deposits of metallic copper in the lake Superior region were once supposed to have been formed from subterranean fusion, but it has been pretty clearly demonstrated that the metal was deposited from solution under the influence of galvanic or magnetic action. There are, however, eruptive rocks which contain minerals in disseminated condition, such as the volcanic rocks containing the amygdaloid copper of lake Superior, and the volcanic rocks in Japan, from which large quantities of copper are obtained. Among the unstratified deposits are what are called *contact* deposits. These occur at the junction, or surface of contact, of two different formations, as where sedimentary have been displaced by igneous rocks. Concretions and sheets of ore are thus found at the junction of trap and sandstone. Deposits occur also as *impregnations*, where the metalliferous mineral is diffused through a mass of rock in irregular streaks of more or less richness, as is generally the case with deposits of quicksilver. *Fahlbands* is a name given to deposits where the ore is diffused through certain layers which become more softened or rotten, or *fahl*, than the other strata. Examples of fahlbands are more frequently met with in mines in Scandinavia than elsewhere. *Stockwork* is a kind of deposit where the rock is penetrated in every direction, so that the ore must be taken out with the mass of the metalliferous rock. Some of the great iron ore deposits of the world, as the magnetic stock at Tagilsk in the Ural and the hematite of the Missouri iron mountain are examples, as also the copper mines of lake Superior, and the silver mines of Norway, Saxony, and Nevada.

Mineral veins are sheets of metalliferous matter, which are divided into three principal varieties—gash veins, segregated veins, and fissure veins. Gash veins are those which have been formed in fissures that have resulted from the shrinking of the rock, and are limited to one rock, generally to one bed. Examples are seen in the lead mines of the upper Mississippi, where the ore is confined to the Galena limestone, a lower Silurian formation. It usually occurs in vertical fissures of little depth, but sometimes in horizontal fissures, often opening into caves or chambers lined with ore; indeed, gash veins are often the commencements of cave formations. Segregated veins are those which are interposed between the strata, and always occur in metamorphic rocks, metamorphism being the cause of the segregation by the separation of the metalliferous materials from the masses of adjacent strata. They have not the banded character of the fissure veins (to be described), and are generally composed of quartz, often rich in gold. All the granitoid rocks of the Alleghanies are of this character, and contain more or less gold. Iron, and also copper, and less frequently nickel, are common associates. Fissure veins, true veins, or lodes, are formed in fissures which have been produced by volcanic or earthquake action. The displacements caused by these forces result in the formation of fissures because of the inability of the strata to return to their former relational position from the interposition of wedges of rock or other causes. The subsequent filling of the fissure by metalliferous material forms the vein or lode. As a consequence of the mode of formation, a fissure-vein is usually of unequal thickness, having the form of a wedge. They usually send out minor fissures, generally at acute angles, which are called branches, and sometimes feeders. The horizontal direction of a vein is called its strike or course, and is expressed by degrees of the quadrant in relation to points of the compass. The vertical angle which it makes with the horizon is called the dip. Geological disturbances are a frequent cause of displacement of parts of veins, forming what are called faults. The ores contained in fissure-veins are various, such as silver, copper, lead, tin, zinc, antimony, and other metals. Gold is less common than in segregated veins, and it is usually only worked in them as a side product. Silver is the most valuable constituent, and these veins constitute the great silver repositories of the world. The Comstock lode and various others in Nevada are examples. Various theories have been advanced to account for the filling of mineral veins. The earliest was the plutonic theory, which supposed that the materials were injected into the fissures in a state of fusion. An irresistible objection to this theory is that such a method would have necessitated the production of alloys to a much greater extent than is found to obtain. A later theory regarded the formation as the result of aqueous deposition, or sedimentation, in the manner of limestone and other sedimentary rocks. An overwhelming objection to this theory is the fact that veins are not horizontally stratified, but the materials are often deposited in vertical positions against the walls of the fissures. The theory of lateral secretion or transfusion has been proposed, which supposes that the contents of the fissures were derived by percolation through the walls of the veins from the adjacent rocks; but a fatal objection to this theory is the fact that the composition of a mineral vein is often the same throughout its extent, or in passing through various strata, whereas it ought to vary if the theory were true. Again, two veins of dissimilar constitution often traverse the same stratum adjacent to each other. This theory demands that they should be alike. The chemical precipitation theory regards the deposition as due to precipitation from superheated solutions under great pressure. These solutions, coming from subterranean sources, part with heat in passing into the fissures. The deposits made by thermal springs are instanced as affording illustrations of this mode of

production. Water containing salts of various kinds is capable, when under great pressure and at a high temperature, of dissolving most minerals; and if it came in contact with silicic acid charged with sulphur, many metals with which it came in contact in its passage through the fissures would be reduced to sulphides and deposited on cooling. Illustrations embracing the action of solutions of various saline and other bodies are carried to a greater or less extent in systematic works. Most mineral veins are more or less decomposed when situated at or near the surface, and, indeed, this condition usually extends downwards to the permanent water level, below which the ore is usually in its original state, which is, generally, a sulphide. In Cornwall the decomposed portion of a mineral vein is called a gossan, and this term is generally used among miners who speak the English language. In the gossan, silver ores are usually converted into chloride, bromide, etc., associated with various-shaped masses of native silver. Sulphide of copper is converted into oxides, and then into malachite, azurite, the green and blue carbonates, and into chrysocolla, the green hydrous silicate. On account of the disintegration which has taken place the gossan is more economically worked than that part of the vein which lies below the water level, and is in its natural state, and therefore the first workings of mineral veins are generally the most profitable.

MINERAL KINGDOM, the inorganic portion of nature. Under this term, however, are not included the inorganic products of organic beings, as sugar, resins, etc., although substances more remotely of vegetable or even animal origin are reckoned among minerals, as coal, fossils, etc. To the mineral kingdom belong liquid and gaseous, as well as solid substances; water, atmospheric air, etc., are included in it. All the chemical elements are found in the mineral kingdom, from which vegetable and animal organisms derive them; but many of the compounds which exist in nature belong entirely to the vegetable and animal kingdoms, and are produced by the wonderful chemistry of life.

MINERALOGY (Fr. *miner*, to dig, mine; Gael. *meinn;* Wel. *mwn*, ore, mine), the science which treats of minerals. But it does not embrace all that relates to the mineral kingdom. *Simple minerals* alone, or homogeneous mineral substances, are regarded as the subjects of mineralogy; rocks formed by the aggregation of simple minerals, and their relations to each other, are the subjects of geology (q.v.). This limitation of the term mineralogy is comparatively recent. Geology or geognosy was formerly included in it. The arrangement and description of simple minerals according to their external characters has been called by Werner and others *oryctognosy*, but the term has fortunately fallen into disuse. Nor is the study of mere external characters sufficient in mineralogy. The chemical composition of minerals equally demands attention. In the classification of minerals, some mineralogists, as Mohs and Jameson, have regarded only the external characters, and some, as Berzelius, only the chemical composition; but the results have been unsatisfactory, and the present tendency is in favor of a system which seeks to constitute natural groups by having regard to both.

Some minerals being of great use, and others highly valued for their beauty, have received much attention from the earliest ages. But the ancient naturalists describe few minerals. The first attempt at scientific mineralogy was by George Agricola in the 16th century. The systems of the Swedes Wallerius and Cronstedt, in the latter half of the 18th c., were the first worthy of the name. That of Werner followed, and was extensively adopted. The discoveries of Hauy in crystallography, and the progress of chemistry, gave mineralogy a new character; and then sprung up two schools of mineralogists, one resting chiefly on external characters, and the other on chemical composition.

The chemical classification of minerals is rendered difficult by the endless variety of combination and proportion in the elements of which they are composed, the presence of substances not essential to the mineral, and yet more or less affecting its characters, and the frequent impossibility of determining what is to be deemed essential, and what accidental. Chemical purity is almost never found in nature. Even the purest diamond, when burned, leaves some traces of ash; and the various colors of diamond, quartz, and other minerals are due to the presence of substances which are often in so small quantity as not to affect their crystalline forms or other physical properties. Again, some minerals of identical chemical composition differ in their crystallization, so that an arrangement founded upon it would separate them too widely. There are also many minerals which are often found in an uncrystallized state, and others which are always so. In the arrangement of minerals into natural groups, their chemical composition, although not alone to be regarded, is of the first importance, so that the place of a new mineral in the system can never be determined without analysis; and in determining the nature of a mineral, chemical tests, such as the application of acids, are continually resorted to. It is also necessary to know its specific gravity, and how it is acted upon both by a moderate heat and by the blowpipe. An examination of the crystalline forms, with measurement of the angles of the crystals, is often sufficient to distinguish minerals which have otherwise much resemblance. The *cleavage* of crystals is also important, a readiness to split in planes parallel to certain of their faces only, by which the *primitive form* of the crystal may be ascertained. Minerals not crystallized exhibit important varities of *structure*, as *laminated, fibrous, granular*, etc. Certain peculiarities of *form*

are also frequently characteristic of uncrystallized minerals, as *mamillary, botryoidal,* etc. Minerals exhibit, when broken, very different kinds of *fracture,* as *even, conchoidal, splintery,* etc. *Opaqueness, translucency,* and *transparency* are more or less characteristic of different kinds: *electric* and *magnetic* properties demand attention; and very important characters are derived from *luster,* which in some minerals is *metallic,* in others *semi-metallic,* in others *pearly, vitreous,* etc. *Color* is not generally of much importance, but in some minerals it very characteristic. *Hardness* and *tenacity* are very important, and are of all various degrees. A few fluid, and even a few gaseous substances, are included in mineralogical systems. *Unctuosity* and other peculiarities to be ascertained by the touch, are very characteristic of some minerals; peculiarities of *taste* and *smell* belong to others.

Mineralogy has very important relations with geology, which cannot be studied without regard to the mineral constituents of rocks. The mineral composition of soils greatly affects vegetation and agriculture. The economical uses of minerals are also very important and various. It is enough merely to allude to coal, lime, salt, and the metallic ores. Naphtha, petroleum, bitumen, asphalt, etc., are of well-known utility; and a high value has always been attached to gems and other ornamental stones.

MINERAL POINT, a city in s. Wisconsin, the n. terminus of the Mineral Point railroad a branch of the Illinois Central; pop. '70, 3,055. It is 45 m. w. of Madison, 180 m. from Chicago, 190 m. from Milwaukee, and 36 m. n.e. of Dubuque, Iowa. Large quantities of lead are taken from mines in the neighborhood, the surrounding country being a rich mineral region; and a vast amount of copper and lead is annually exported. It has zinc smelting furnaces, lead furnaces and foundries, 2 banks, a number of excellent public schools, a seminary, 6 churches, 2 hotels, 3 newspapers, and a car factory. It is a market for grain and general produce supplied by a tract of country 15 m. square.

MINERAL RESINS. See RESINS.

MINERAL TALLOW, or HATCHETINE, a remarkable substance found in several places in Britain, Germany, Siberia, etc., soft and flexible, yellowish white, or yellow, resembling wax or tallow, often flaky like spermaceti, inodorous, melting at 115°–170° F., and composed of about 86 carbon and 14 hydrogen.

MINERAL WATERS. This term is usually applied to all spring waters which possess qualities in relation to the animal body different from those of ordinary water. Mineral waters have been used as remedial agents from a very early period. The oldest Greek physicians had great faith in their curative power, and the temples erected to Æsculapius were usually in close proximity to mineral springs; they had recourse to the sulphurous thermal springs of Tiberias (now Tabareah), which are still used by patients from all parts of Syria in cases of painful tumor, rheumatism, gout, palsy, etc., and to the warm baths of Calirrhoe, near the Dead sea, which are mentioned by Josephus as having been tried by Herod in his sickness. We are indebted to the Romans for the discovery not only of the mineral thermic springs in Italy, but of some of the most important in other parts of Europe, amongst which may be named Aix-la-Chapelle, Baden-Baden, Bath, Spa in Belgium, and many others; and Pliny, in his *Natural History,* mentions a very large number of mineral springs in almost all parts of Europe.

The therapeutic action of mineral waters, or of spas, as they are frequently termed, depends chiefly upon their chemical composition and their temperature, although a variety of other circumstances, as situation, elevation, climate, geological formation, mean temperature, etc., have an important bearing upon the success of the treatment.

The best time for undergoing a course of mineral waters is, in the majority of cases, the months of June, July, August, and September. There are, however, exceptions depending upon climate; for example, at Gastein, celebrated for its thermal springs, the weather is changeable and stormy in June and July, but pleasant in May, August, and September. Early rising is usually advisable during a course of mineral waters, and, as a general rule, the water should be drunk before breakfast, at intervals of about a quarter of an hour between each tumbler, moderate exercise being taken in the intervals. In many cases bathing is of even greater importance as a remedial agent than drinking. Baths are generally taken between breakfast and dinner; and should never be taken soon after a full meal. The time during which the patient should remain in the bath varies very much at different spas, and the directions of the local physician should be strictly attended to on this point. It is impossible to determine beforehand how long a course of mineral waters should be continued, as this entirely depends upon the symptoms observed during treatment. As a general rule the treatment should not be protracted beyond the space of six weeks or two months, but on this point the patient must be solely guided by the physician resident at the spa. It cannot be too forcibly impressed upon the patient that indulgence in the pleasures of the table, and excesses of any kind, frequently counteract the salutary effects of the waters, while perfect mental relaxation is an important auxiliary to the treatment. It will be seen from remarks on the nature of the cases likely to receive benefit from the various kinds of mineral waters that spas are only suitable for patients suffering from *chronic disorders.*

No classification of mineral waters based upon their chemical composition can be

strictly exact, because many springs are, as it were, intermediate between tolerably well characterized groups. The following classification, which is adopted by Dr. Althaus, in his *Spas of Europe* (Lond. 1862), is perhaps the most convenient: 1. Alkaline waters; 2. Bitter waters; 3. Muriated waters; 4. Earthy waters; 5. Indifferent thermal waters; 6. Chalybeates; 7. Sulphurous waters.

1. The alkaline waters are divisible into (*a*) *Simple alkaline acidulous waters*, of which the chief contents are carbonic acid and bicarbonate of soda. The most important spas of this class are the thermal springs of Vichy and the cold springs of Fachingen, Geilnau, and Bilin. These waters are useful in certain forms of indigestion, in jaundice arising from catarrh of the hepatic ducts, in gall-stones, in renal calculi and gravel, in gout, in chronic catarrh of the respiratory organs, and in abdominal plethora. Vichy (q.v.) may be taken as the representative of this class of springs. (*b*) *Muriated alkaline acidulous waters*, which differ from the preceding sub-group in additionally containing a considerable quantity of chloride of sodium. The most important spas of this kind are the thermal springs of Ems, and the cold springs of Selters, Luhatschowitz, and Salzbrunn. They are useful in chronic catarrhal affections of the bronchial tubes, the stomach, and the intestines, and the larynx; and the Ems waters possess a high reputation in certain chronic diseases of the womb and adjacent organs. (*c*) *Alkaline saline waters*, of which the chief contents are sulphate and bicarbonate of soda. The most frequented of these spas are the warm springs of Carlsbad and the cold springs of Marienbad. Patients suffering from abdominal plethora are those most frequently sent to these spas, which often prove of great service if the stagnation of the blood is owing to habitual constipation, pressure from accumulated fæces, or congestion of the liver, unconnected with diseases of the heart or lungs. These waters, especially those of Carlsbad, afford an excellent remedy for the habitual constipation which so frequently arises from sedentary occupations; the result being much more permanent than that produced by strong purgative waters.

2. The chief contents of the bitter waters are the sulphates of magnesia and soda; and the best-known spas of this class are those of Püllna, Saidschütz, Sedlitz, Friedrichshall, and Kissingen; although there are two English spas—namely, the bitter water of Cherry Rock, near Kingswood, in Gloucestershire, and the Purton spa, near Swindon, in Wiltshire—which "are, by their chemical composition, admirably suited for the treatment of many cases of disease, and may perhaps even prove superior to the continental spas of this class."—Althaus, *op. cit.* p. 360. These waters act both as purgatives and diuretics, and may therefore be used advantageously in the numerous cases in which it is advisable to excite the action both of the bowels and kidneys.

3. The muriated waters are divisible into (*a*) *Simple muriated waters*, of which the chief contents are a moderate quantity of chloride of sodium, or common salt. The chief spas of this class are Wiesbaden and Baden-Baden, which are hot; those of Soden (in Nassau), of Mondorf (near Luxembourg), and of Canstatt (near Stuttgart), which are tepid; and those of Kissingen, Homburg, and Cheltenham, which are cold. They are chiefly employed in cases of gout, rheumatism, scrofula, and abdominal plethora. (*b*) *Muriated lithia waters*, of which the chief contents are the chlorides of sodium and lithium. The discovery of lithia in some of the Baden-Baden springs is so recent that there is as yet no sufficient experience concerning their therapeutic action. In gout they first aggravate the pain, but then give relief; and in periodic headache they have been found serviceable. (*c*) *Brines*, whose chief contents are a large amount of chloride of sodium. Amongst the spas of this kind those of Rehme, in Westphalia, and Nauheim, in Hesse, have the greatest reputation. They are mostly employed for bathing, and are often of much service in scrofula, anæmia, rheumatism, certain forms of paralysis, and catarrh of the mucous membranes. (*d*) *Iodo-bromated muriated waters*, in which, besides a moderate quantity of chloride of sodium, the iodides and bromides of sodium and magnesium are contained in an appreciable quantity. Kreuznach is the most celebrated of the spas of this class. Its waters are used both for drinking and bathing, and are of service in scrofulous infiltrations of the glands, in scrofulous ulcers, in chronic inflammation of the uterus and ovaries, etc. The waters of Hall, in Austria proper, are also of this class, and have a high reputation in cases of bronchocele or goiter.

4. Earthy waters, of which the chief contents are sulphate and carbonate of lime. The most important waters of this class occur at Wildungen, Leuk, Bath, Lucca, and Pisa. The Wildungen water, which is exported in large quantities, is, according to Dr. Althaus, "a capital diuretic, and not only promotes the elimination of gravel and renal calculi, but by its tonic action on the mucous membrane of the urinary passages serves to prevent the formation of fresh concretions. It is also much used for chronic catarrh of the bladder, neuralgia of the urethra and neck of the bladder, dysuria, and incontinence of urine." The baths of Leuk, in which many patients remain nine hours daily (viz., from 4 A.M. to 10 A.M., and from 2 P.M. to 5 P.M.), until an eruption appears, are chiefly used in chronic skin diseases. The waters of Bath, Pisa, and Lucca, which are thermal, are useful in chronic skin diseases, scrofula, gout, rheumatism, etc.

5. Indifferent thermal waters, which usually contain a small amount of saline constituents. Of the spas of this class, the most important are Gastein (95° to 118°), Töplitz (120°), Wildbad (96°), Warmbrunn (100°), Clifton (86°), and Buxton (82°). Their most

striking effects are to stimulate the skin and excite the nervous system. "They are especially used in chronic rheumatism and atonic gout; in diseases of the skin, such as prurigo, psoriasis, lichen; in neuralgia and paralysis due to rheumatic and gouty exudations, to parturition, or to severe diseases, such as typhoid fever and diphtheria; in hysteria; and in general weakness and marasmus."—Althaus, *op. cit.* p. 421.

6. Chalybeate waters, which are divisible into (*a*) *Simple acidulous chalybeates*, whose chief contents are carbonic acid and bicarbonate of protoxide of iron; and (*b*) *Saline acidulous chalybeates*, whose chief contents are sulphate of soda and bicarbonate of protoxide of iron. These waters are considered in a special article. See CHALYBEATE WATERS.

7. Sulphurous waters, which contain sulphureted hydrogen or metallic sulphides (sulphurets), or both. The most important sulphurous thermals are those of Aix-la-Chapelle, Baden (near Vienna), Baréges, Eaux-Chaudes, and Bagnères de Luchon; whilst among the cold sulphurous springs, those of Nenndorf (in Hessen-Nassau) and Harrogate are of great importance. They are extensively used in chronic diseases of the skin, and are of service in many cases in which exudations require to be absorbed, as in swellings of the joints, in old gunshot-wounds, and in chronic gout and rheumatism. In chronic laryngeal and bronchial catarrh, they frequently give relief, and in chronic poisoning by lead or mercury, they favor the elimination of the poison, although to a far less degree than iodide of potassium taken internally. The sulphurous waters are employed externally and internally, and mineral mud-baths are believed by many physicians to form a valuable auxiliary to this treatment.

For further information on this subject, the reader is referred to the work of Dr. Althaus (of which free use has been made in this article), and to the *Dictionnaire Général des Eaux Minérales et d'hydrologie Médicale* of MM. Durand-Fardel, Le Bret, and Lefort.

MINERAL WATERS, ARTIFICIAL. See AËRATED WATERS, *ante*.

MINERSVILLE, a borough in e. Pennsylvania, on a branch of the Philadelphia and Reading railroad at its junction with the Schuylkill Haven and Mine Hill railroad, and the terminus of the People's railway to Mount Carbon; pop. '70, 3,699. It is on the West Branch of the Schuylkill river, in the center of the anthracite coal mining region, not far from Broad mountain, 46 m. n.e. of Harrisburg, and 4 m. w. of Pottsville, in the southern or Schuylkill coal field. Other mineral deposits are sandstone, shale, and limestone. It is in a valley surrounded by hills seamed with iron ore and covered with the rough and dangerous apparatus of anthracite coal mining. It has a newspaper, 10 churches, a public library, water works, a well-organized fire department; there are machine shops and iron foundries, an anthracite furnace, a car factory, soap and shoe factories, and flour and saw mills.

MINERVA, the name of a Roman goddess, identified by the later Græcising Romans with the Greek *Athene*, whom she greatly resembled, though, like all the old Latin divinities, there was nothing anthropomorphic in what was told concerning her. Her name is thought to spring from the same root as *mens* (the mind) and *monēre* (to warn or advise); and the ancient Latin scholar and critic, Varro, regarded her as the impersonation of divine thought—the plan of the material universe of which Jupiter was the creator, and Juno the representative. Hence all that goes on among men, all that constitutes the development of human destiny (which is but the expression of the divine idea or intention), is under her care. She is the patroness of arts and trades; and was invoked alike by poets, painters, teachers, physicians, and all kinds of craftsmen. She also guides heroes in war; and, in fact, every wise idea, every bold act, and every useful design, owes something to the high inspiration of this virgin goddess. Her oldest temple at Rome was that on the Capitol, but she had another on the Aventine. Her festival was held in March, and lasted five days, from the 19th to the 23d inclusive.

ATHENE, or PALLAS ATHENE, the Greek goddess corresponding, as we have said, to the Roman Minerva, was one of the few truly grand *ethical* divinities of Greek mythology. Different accounts are given of her origin and parentage, probably from the jumbling together of local legends; but the best known, and in ancient times, the most orthodox version of the myth represented her as the daughter of Zeus and Metis. Zeus, we are told, when he had attained supreme power after his victory over the Titans, chose for his first wife Metis (Wisdom); but being advised by both Uranus and Gæa (Heaven and Earth), he swallowed her, when she was pregnant with Athene. When the time came that Athene should have been born, Zeus felt great pains in his head, and caused Hephæstus (Vulcan) to split it up with an axe, when the goddess sprang forth—fully armed, according to the later stories. Throwing aside the thick veil of anthropomorphism which conceals the significance of the myth, we may see in this account of Athene's parentage an effort to set forth a divine symbol of the combination of power and wisdom. Her father was the greatest, her mother the wisest of the gods. She is literally born of both, and so their qualities harmoniously blend in her. It is possible that the constant representation of her as a strictly maiden goddess, who had a *real*, and not a merely *prudish* antipathy to marriage, was meant to indicate that qualities like hers could not be mated, and that, because she was perfect, she was doomed to virginity. She was not, however, a cold unfeeling divinity; on the contrary, she warmly and

actively interested herself in the affairs of both gods and men. She sat at the right hand of Zeus, assisting him with her counsels; she helped him in his wars, and conquered Pallas and Encelados in the battles of the giants. She was the patroness of agriculture, invented the plow and rake, introduced the olive into Attica, and (in harmony with her character as the personification of active wisdom) taught men the use of almost all the implements of industry and art; and is said to have devised nearly all feminine employments. Philosophy, poetry, and oratory were also under her care. She was the protectress of the Athenian state, was believed to have instituted the court of justice on Mars' Hill (the Areiopagus). As a warlike divinity, she was thought to approve of those wars only which were undertaken for the public good, and conducted with prudence; and thus she was regarded as the protectress in battle of those heroes who were distinguished as well for their wisdom as their valor. In the Trojan wars, she favored the Greeks—who, in point of fact, were in the right. Her worship was universal in Greece, and representations of her in statues, busts, coins, reliefs, and vase-paintings were and are numerous. She is always dressed, generally in a Spartan tunic, with a cloak over it, and wears a helmet, beautifully adorned with figures of different animals, the ægis, the round Argolic shield, a lance, etc. Her countenance is beautiful, earnest, and thoughtful, and the whole figure majestic.

MINERVI'NO, a t. of southern Italy, in the province of Bari, called the *Balcony of Puglia*, from the extensive view it commands of several cities. It stands on a fine hill, and enjoys excellent air. Pop. 13,800.

MINES, in law. In England and Ireland the crown has the right to all mines of gold and silver; but where these metals are found in mines of tin, copper, iron, or other baser metal, then the crown has only the right to take the ore at a price fixed by statute. As a general rule, whoever is the owner of freehold land has a right to all the mines underneath the surface, for his absolute ownership extends to the center of the earth. When the land is given by will or otherwise to a tenant for life, while a third party has the reversion, then the tenant for life is held to be entitled not to open mines which have never before been opened, but to carry on such as have been open, and are going mines. So in the case of a lease of lands for agricultural purposes, if nothing is said as to mines, the tenant is not entitled to open any mines, for that would be committing waste. It is not uncommon for one person to be owner of the surface of the land and another to be owner of the mines beneath; or several persons may be owners of different kinds of mines lying above each other in the different strata. Many questions have been raised lately between railway companies and mine-owners as to their respective rights and liabilities. When a railway passes through a mining country it is generally optional with the owner to sell to the company merely the surface of the lands, reserving to himself the mines beneath; and it is usually provided that, if ever the owner work his mines so near to the railway as to endanger its stability, the company must have notice of that fact, and then, if necessary, may purchase the mines immediately under the railway. But the courts have determined that even though the owner of the land reserve his right to minerals, he is nevertheless prevented, by common law, from working the mines immediately under the railway, so as to endanger the use of the railway. In these matters the law of Scotland does not at all differ, though, as to other points of the common law, some differences of no great importance occur. See Paterson's *Compendium of English and Scottish Law*.

The practical working of mines and collieries in any part of Great Britain has been controlled by certain recent acts of parliament, with a view to insure the greater safety of the persons working them, and to prevent the employment of women and children. Thus, the owners of mines are prohibited, by the mines regulation acts, 1872 (repealing prior acts), from employing any female or boy under 10 underground. Boys under 16 can only be so employed ten hours per day, and boys under 12 must attend school at certain times. No owner or worker of a mine or colliery is allowed to pay the wages of the men at any tavern, public-house, beer-shop, or place of entertainment, or any office or outhouse connected therewith. No person under 18 is to be employed at the entrance of any mine, to have charge of the steam-engine or windlass, or other machinery and tackle for letting down and bringing up the men. Inspectors are appointed by government for the express purpose of visiting mines, and seeing that the statutes are complied with. The statutes in question now apply not only to coal-mines and collieries, but to metalliferous mines of all kinds. Whenever an inspector, on examination, finds anything dangerous or defective in the mine, he is bound to give notice to the owner, so that it may be amended. In case of accidents occurring in the mine, caused by explosion, and resulting in loss of life or bodily injury, the owner is bound, within twenty-four hours thereafter, to send notice to the secretary of state, and to the district inspector of mines, specifying the probable cause of the accident.

MINES, MILITARY, constitute at once one of the most important departments in military engineering, and a very formidable accessory both in the attack and defense of fortresses. A military mine consists of a gallery of greater or less length, run from some point of safety under an opposing work, or under an area over which an attacking force must pass, and terminating in a chamber which, being stored with gunpowder, can be exploded at the critical moment. Mines are of great use to the besiegers in the overthrow

of ramparts and formation of a breach; the *countermines* of the besieged in undermining the glacis over which the assaulting column must charge, and blowing them into the air, or in destroying batteries erected for breaching, are equally serviceable. But far above the actual mischief wrought by the mine—often very great—is its moral influence on the troops, and especially on the assailants. The bravest soldiers, who advance without flinching to the very mouth of the cannon *which they see*, will hesitate to cross ground which they suppose to be undermined, and on which they may be dashed to destruction in a moment, without the power of averting the *unseen* danger. The first employment of mines was very ancient, and merely consisted in obtaining an entrance to the interior of towns by passing beneath the defenses; but this soon fell into disuse, the chances of success being merely those of introducing a body of men before the besieged discovered the mine. The next use occurred during the middle ages, and was more destructive. The miners went no further than beneath the wall, then diverged to either side, and undermined the wall, say for about 100 feet. During the process, the wall was sustained by timber-props; and these being ultimately set on fire, the wall fell; and the besiegers, who had awaited the opportunity, rushed in at the breach. This use of mines of *attack* necessitated those of *defense*, which obtained in mediæval times and have ever since kept the name of "*countermines*." The earliest subterranean defense consisted of a gallery surrounding the fort in advance of the foot of the wall, and termed an "envelope-gallery." From this the garrison would push forward small branches or tributary galleries, whence they could obtain warning of the approach of hostile miners, and by which they succeeded, at times, in overthrowing the battering-rams or towers of the besiegers.

Two centuries appear to have elapsed between the introduction of gunpowder into European warfare and its application to subterranean operations. The first instance of this occurred in 1503, at the siege of the Castello del' Uovo, in the bay of Naples, which a French garrison had succeeded in holding for three years against the combined Spanish and Neapolitan forces. At length, a Spanish capt., Pedro Navarro, devised a gallery into the rock, which he stored with powder, whereof the explosion, hurling portions of the rock and many of the besieged into the sea, caused the immediate capture of the place. At once the use of mines of attack spread throughout Europe; and so irresistible were they soon considered, that it was not unusual for the besieger, after preparing his mine, to invite the besieged to inspect it, with the view of inducing the latter at once to surrender. Defense soon availed itself of the new power, and, retaining the envelope-gallery as a base, ran small countermines in many directions, to ascertain by hearing the approach of the enemy's sappers—his work being audible, to a practiced ear, at a horizontal distance of 60 feet. Small charges were then exploded, which, without creating surface disturbance, blew in the approaching gallery, and buried the sappers in its ruins. Thus commenced a system of subterranean warfare, requiring the greatest risk and courage, in which the operator was in constant danger of being suffocated. Of course, in such a system, the balance of advantage lay with the besieged, who had ample opportunities before the siege commenced, of completing his ramifications in every direction, and, if desirable, of revetting them with masonry, which much diminished the chance of being blown in; while the assailant, no longer able to cross the glacis by an open zigzag trench, was compelled to engage in a most uncertain subterranean advance. The French engineer, Belidor, in the 18th c., restored the advantage to the attack, by demonstrating that the explosion of a very large mass of powder in a mine which had not yet entered the labyrinth of defensive mines, effected the destruction of the latter for a great space round, clearing the way with certainty for the hostile advance. Although the primary purpose of a mine is the explosion of a charge of powder, they are often used as a means of communication between different works, or between different parts of the same work, some being constructed of size sufficient to permit the passage of four men abreast, of horses, and of artillery.

It is, of course, impossible, in such a work as this, to give even an outline of the professional part of military mining; but the article would be incomplete without some allusion to the main principles.

Mines are either vertical—when they are called *shafts*—horizantal, or inclined, in either of which cases, they are "galleries," the word "ascending" or "descending" being added if there be inclination. The dimensions range from the "great gallery," 6 ft. 6 in. by 7 ft., to the "small branch"—the last diminutive of the gallery—which has but 2 ft. 6 in. height, with a breadth of 2 feet. The most frequent work is the "common gallery," 4 ft. 6 in. by 3 ft., which is considered the easiest for the miner.

The sapper's tools are numerous, but most in request are his shovel, pickaxe, and, above all, his "push-pick:" he has besides a barrow, a small wagon, a lamp, and other accessories. As he advances, it is necessary to line his gallery, always at the top, and almost always at the sides. This he does either by frames—which resemble door-frames, and serve to retain horizontal planks or "sheeting" in position against the earth—or by cases somewhat resembling packing-cases, of little depth, which are used to form the sides and top. With cases, galleries are supposed to advance one foot and a half per hour; while with frames, the progress is barely more than half that amount.

When a mine is exploded, the circular opening on the surface is called the *crater*; the *line of least resistance* is the perpendicular from the charge to the surface; the half-

diameter of the crater is its radius; and the *radius of explosion* is a line from the charge to the edge of the crater, on the hypothenuse of the triangle, the revolution of which would form the cone. When the diameter equals the line of least resistance, the crater is called a one-lined crater; when it doubles that line, a two-lined crater; and so on. The common mine for ordinary operations is the two-lined crater; and for this the charge of powder should—in ground of average weight and tenacity—be in pounds a number equal to one-tenth of the cube of the line of least resistance in feet, for example, at a depth of 18 ft., the charge should consist of 583 pounds. In surcharged mines, or globes of compression, as introduced by Belidor, vastly greater charges are employed, and craters of six lines are sometimes produced. The rules, in these cases, for computing the charges vary exceedingly, according to different engineers, and in every case are very complicated. Previous to the explosion, the gallery is filled up behind the charge, or *tamped*, with earth, sand-bags, etc., to prevent the force of the powder wasting itself in the mine. This tamping must extend backwards for one and a half or twice the length of the line of least resistance. The mine is commonly fired by means of a powder-hose, composed of strong linen, inclosed in a wooden pipe laid carefully through the tamping, or by wires from a voltaic battery.

In the system of countermines the magistral gallery is immediately within the wall of the counterscarp, through orifices in which it derives light and air, and by its loopholes, the defenders can take in rear any enemy who might obtain momentary possession of the ditch. Further in advance, and reached by galleries of communication is the envelope-gallery from which radiate the listeners. To prevent the enemy's advances, these listeners should not be more than about 54 feet apart. Besides listening, they are used for aggressive purposes, such as driving branches and blowing in or up hostile works. Modern engineers object to the envelope-gallery, as affording too good a base to the enemy, should he obtain possession of it; and either dispense with it altogether, or merely retain it in short sections. At suitable points among the mines, small magazines for tools and powder are formed; and at about every 30 yards, loopholed doors of great strength are made, to stop the advance of an enemy, should he break into the galleries.

In the course of their excavations, hostile miners frequently meet, or approach within a few feet. It becomes, then, merely a question of time which shall destroy the other; shells, pistols, pikes, and petards, as well as small mines, being used with murderous effect.

Provision is made for pumping foul air out of mines; but such military works are in general badly ventilated.

MINGHETTI, Cavaliere Marco, a distinguished Italian writer and statesman, and for a time prime minister of Italy, was born at Bologna, on Nov. 8, 1818. He belonged to an opulent commercial family, and on the termination of his studies, entered on an extensive continental tour, with the object of closely investigating the political, social, and economical institutions of France, Germany, and more especially of Britain. On his return from traveling, he published his maiden essay, inculcating the great commercial advantages of free trade, as existing in England, and espousing with warmth the economical views of Richard Cobden. In 1846 Minghetti opened his political career by starting a journal of liberal tendencies, soon after the advent of Pius IX. to power; in 1847 he was elected member of the *Consulta delle Finanze*, and in 1848 became minister of public works. Having speedily lost faith in papal progression, Minghetti withdrew from office, and joined the army of Charles Albert in Lombardy, where he was warmly received by the king, and appointed captain. After the battle of Goito he was promoted major; and for his bravery in the engagement of Custoza, he received from the king the cross of the knights of St. Maurizio. On the conclusion of the war, Minghetti resumed his study of political economy, and gained the confidence of Cavour, by whom he was consulted during the conferences of Paris. He subsequently became secretary for foreign affairs, and only resigned with Cavour on the peace of Villafranca. Minghetti became minister of the interior in 1860, and premier in 1863. On leaving the ministry, he went as ambassador to London in 1868, and was subsequently, for a short time, minister of agriculture. In 1873 he became premier of a new ministry. His chief work is *Della Economia pubblica e delle sue Attinenze con la morale, e Col diritto* (1859).

MINGRE'LIA, the name of a division of Russia in Asia, on the Black sea; partly bounded by Circassia; 2,600 sq.m.; pop., 240,000. It is a rugged, mountainous country, but, in the southern part, fertile slopes lie along the river Rion, the most important stream in this part of Russia. Extensive forests of valuable timber cover the mountains, and there are mines of copper, some of which are worked; gold has also been found The country is peopled by Georgians; not, however, of as fine a type as those who inhabit the Caucasus. It was formerly a part of Georgia, and, at a later period, was ruled by native princes; one of whom, in 1867, ceded his rights to Russia, on being paid the sum of 1,000,000 roubles. Mingrelia was the ancient Colchis, where was the mythical golden fleece, in pursuit of which occurred the expedition of the Argonauts (q.v.). It was also the birth-place of Medea. The productions are tobacco, maize, rice, wool, honey, and wine. Silk is manufactured to some extent.

MINHO. See Entre Douro e Minho

MINHO (Span. *Miño*, anc. *Minius*), a river of Spain and Portugal, rises in the n.e. of Galicia, in lat. about 43° 20′ n., long. about 7° 15′ w. Its course is s.w. through the modern Spanish provinces of Lugo and Orense, after which, continuing its course, and forming the northern boundary of the Portuguese province of Minho, it falls into the Atlantic Ocean. Its length, exclusive of windings, is 130 m., and it is navigable for small craft 23 m. above its mouth.

MINIATURE-PAINTING, or the painting of portraits on a small scale, originated in the practice of embellishing manuscript books. See MANUSCRIPTS, ILLUMINATION OF. As the initial letters were written with red lead (Lat. *minium*), the art of illumination was expressed by the low-Latin verb *miniare*, and the term *miniatura* was applied to the small pictures introduced. After the invention of printing and engraving, this delicate art entered on a new phase; copies, in small dimensions, of celebrated pictures came to be in considerable request, and, in particular, there arose such a demand for miniature-portraits that a miniature, in popular language, is held to signify "a very small portrait." Soon after their introduction, miniature-portraits were executed with very great skill in England. Holbein (b. 1498, d. 1554) painted exquisite miniatures, and having settled in London, his works had great influence in calling forth native talent. The works of Nicholas Hilliard (b. at Exeter 1547, d. 1619) are justly held in high estimation. Isaac Oliver (b. 1556, d. 1617) was employed by queen Elizabeth and most of the distinguished characters of the time; his works are remarkable for careful and elaborate execution; and his son, Peter Oliver, achieved even a higher reputation. Thomas Flatman (b. 1633, d. 1688) painted good miniatures. Samuel Cooper (b. London 1609, d. 1672), who was, with his brother Alexander, a pupil of his uncle, Hoskins, an artist of reputation, carried miniature-painting to high excellence. Cromwell and Milton sat to him—he was employed by Charles II.—and obtained the highest patronage at the courts of France and in Holland. Till within these few years miniature-painting continued to be successfully cultivated in Britain; but it has received a severe check since photography was invented, and most of the artists of the present time who exercised their talents in this exquisite art have left it for other branches of painting. As to technical details, the early artists painted on vellum, and used body-colors, that is, colors mixed with white or other opaque pigments, and this practice was continued till a comparatively late period, when thin leaves of ivory, fixed on card-board with gum, were substituted. Many of the old miniature-painters worked with oil-colors on small plates of copper or silver. After ivory was substituted for vellum transparent colors were employed on faces, hands, and other delicate portions of the picture, the opaque colors being only used in draperies and the like; but during the present century, in which the art has been brought to the highest excellence, the practice has been to execute the entire work, with the exception of the high lights in white drapery, with transparent colors. In working the general practice is to draw the picture very faintly and delicately with a sable-hair pencil, using a neutral tint composed of cobalt and burned sienna. The features are carefully made out in that way, and then the carnations, or flesh-tints, composed of pink, madder, and raw sienna, gradually introduced. The drapery and background should be freely washed in, and the whole work is then brought out by hatching, that is, by painting with lines or strokes, which the artist must accommodate to the forms, and which are diminished in size as the work progresses. Stippling, or dotting, was a method much employed, particularly in early times; but the latest masters of the art preferred hatching, and there are specimens by old masters, Perugino, for instance, executed in that manner.

MINIÉ, CLAUDE ÉTIENNE, b. Paris, 1810; entered the army as a volunteer, and served in Algeria during several campaigns. He was made capt. in 1849, and in 1852 was appointed by Napoleon III. superintendent of the school of ordnance at Vincennes. In 1858 he resigned this post, and was appointed by the Egyptian government to superintend a manufactory of arms and a school of gunnery at Cairo. His invention of the Minié rifle was made about 1833, and adopted by the French government. It was the first practical introduction of the principle of expansion in the manufacture of firearms, and gave to the bullet a precision and range previously unknown to gunnery.

MIN'IM, the name of one of the notes in modern music, the value of which is the half of a semibreve.

MINIMS (Lat. *fratres minimi*, least brethren), so called, in token of still greater humility, by contrast with the *fratres minores*, or lesser brethren of St. Francis of Assisi (q.v.), an order of the Roman Catholic church, founded by another St. Francis, a native of Paula, a small town of Calabria, about the middle of the 15th century. Francis had, as a boy, entered the Franciscan order; but the austerities of that rule failed to satisfy his ardor, and on his return from a pilgrimage to Rome and Assisi, he founded, in 1453, an association of hermits of St. Francis, who first lived in separate cells, but eventually were united in the conventual life in 1474, and established in several places in Calabria and Sicily. Francis was also invited into France by Louis XI., and founded houses of his order at Amboise and at Plessis-les-Tours. In Spain the brethren took the name of "Fathers of Victory," in memory of the recovery of Malaga from the Moors, which was ascribed to their prayers. It was not till very near the close of the life of Francis that he drew up the rule of his order. It is exceedingly austere, the brethren being debarred

the use not only of meat, but of eggs, butter, cheese, and milk. Notwithstanding its severity, this institute attained considerable success; its houses, soon after the death of Francis (1502), numbering no fewer than 450. It has reckoned several distinguished scholars among its members; but in latter times the order has fallen into decay, being now limited to a few houses in Italy, the chief of which is at Rome. The superiors of convents in this order are called by the curious name of *corrector*, the general being styled *generalis corrector*. A corresponding order of females had its origin about the same time, but this order also has fallen into disuse.

MINING is a general term for the underground operations by which the various metals and other minerals are procured. It has been practiced to some extent from the remotest times, as is proved by the reference to it in the 28th chapter of the book of Job. In its proper sense, the art was certainly known to the ancient Phenicians and Egyptians, and also to the Greeks and Romans. Mining operations were carried on in Britain by the latter at the time of the Roman conquest. After the Norman conquest, Jews, and, at a later time, Germans were largely employed in our mines. The introduction of gunpowder as a blasting material in 1620, led the way to many improvements in mining; so also did the introduction of powerful engines for pumping water, about the beginning of the 18th century.

There are two principal methods of mining: one of which is adopted where the mineral occurs in veins or lodes, as copper and lead ore; and the other where the mineral occurs in more or less parallel beds, as coal. Mining in alluvial deposits is a third method, largely practiced in the gold regions of California and Australia, and includes the novel process of "hydraulic mining."

In mines like those of Cornwall and Devonshire, where most of the copper and tin of Great Britain, and also some of the lead, are obtained, the ores occur in veins filling cracks or fissures in the rocks. Such veins are termed lodes, to distinguish them from veins of quartz and other non-metallic minerals. Lodes are very irregular in size, and in the directions they take, though they usually follow one general line.

A lode consists of a main or "champion" lode and branches, called *feeders*, *shoots*, and *strings*. Mineral veins sometimes extend for several miles through a country; but they expand and contract so much, and split up into so many branches, that it is perhaps uncertain whether the same lode has ever been traced for more than a mile. Veins seldom deviate more than 45 degrees from a perpendicular line, and descend to unknown depths. They penetrate alike stratified and unstratified rocks. Those veins which run e. and w. have been observed to be the most productive.

Fig. 1 shows a section of a Cornish mine across the lodes *l, l, l, l; a* is the engine-shaft, in which are the pumps and the ladders for ascent and descent; *b, b* are *whim-shafts* for raising the ore, which is done by means of buckets. The adit, or day-level, is a long passage to which the water of the mine is pumped up and conveyed away. Some adits are made to traverse several mines. The great adit which drains the mines of Glennap and Redruth, in Cornwall, is 30 m. long. At *c, c, c*, are cross cuts, by which the workings on the different lodes are connected.

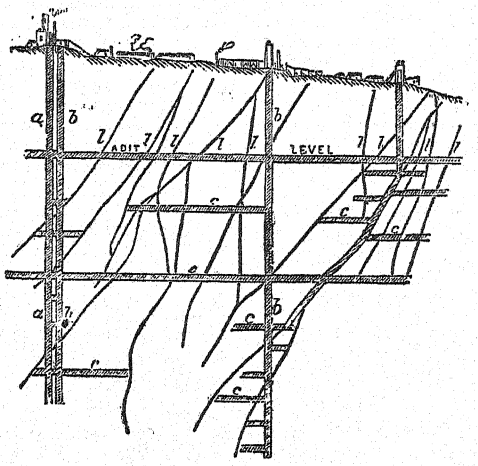


Fig. 1.—Cross-section of a Cornish Mine.

A horizontal section in the direction of a lode would show the horizontal galleries, termed *levels*, which are driven upon the lode, and small upright shafts, called *winces*. Levels are generally about ten fathoms (60 ft.) apart. They are rarely perpendicular above each other, as they follow the inclination of the vein. In the section, the richer portions of the lode, termed "bunches," are shown shaded; and where these have been removed, and their place filled with rubbish, angular fragments are represented. This is necessary to prevent the sides of workings from falling in. The bottom of the engine-shaft is the lowest portion of the mine. It is called the *sump*, and is the place where the water from the various levels and workings collects, in order to be pumped up to the adit. The galleries and shafts in an extensive mine are very numerous, making it altogether a very complicated affair. The shafts, however, have all distinct names, and the levels are known by their depth in fathoms, so that particular places are as easily found as streets in a town. The underground workings of the Consolidated mines, which are the largest in Cornwall, being a

conjunction of four mines, are 55,000 fathoms, or 63 m., in extent. In working out the lode between one level and another, the miner usually goes upwards, it being easier to throw down the ore than to raise it up. He works with the light of a candle, stuck with clay to the side of the mine. His tools are few—namely, a pick, a hammer, and some wedges where the vein is soft and friable; but it is generally hard enough to require blasting, in which case he uses a *borer* or *jumper*, and some smaller tools for cleaning and stemming the hole which is made. The ore is filled into wagons, and then drawn along the gallery to the shaft, to be raised to the surface in *kibbles*.

A vein may be 30 or 40 ft. thick, and so poor in ore as not to be worth working; again, it may be only a few inches thick, and yet its richness may amply repay the labor of extracting it. Three or four feet may be taken as the average of several kinds of veins. In extensive mines, portions of the ore are here and there left in the lode, so as to furnish a steady supply when other parts are unproductive. These are called *eyes*, and when they are afterwards removed, the operation is termed *picking out the eyes of the mine*.

The old plan of ascending and descending the mines by ladders, so destructive to the health of the miners, is still largely in use. The ladders are now about 25 ft. long, and set with a slope. There is a platform at the bottom of each called a *sollar*, with a man-hole in it leading to the next ladder beneath. Some of the Cornish mines are half a mile deep, so that it takes the miner an hour to reach the surface after he is done with his work; most of the journey being accomplished on wet, slippery ladders. The bad effects of the fatigue so produced are augmented by the fact that the men come from a constant temperature of 80° or 90° F. below, to one of perhaps 30° or 40° on the surface. Dr. J. B. Sanderson states, as the result of recent inquiries, that 90° F. is the highest limit of temperature consistent with healthy labor in a mine.

A great improvement on the ladder system is now in operation in several of the deep Cornish mines. It is a method first introduced into the deep mines of the Harz, and called the *fahr-kunst*. The plan of this "man-engine" is this. Two rods descend through the depth of the shaft, and upon these bracket-steps are fixed every 12 feet. The rods move up and down alternately through this distance by means of a reciprocating motion. If the miner wishes to ascend, he places himself on the lower step of the first rod, and is raised by the first movement of this rod to the level of the second step on the second rod, to which he now crosses. The next movement raises the second rod, and brings the second step up to the level of the third step of the first rod, to which he next crosses; and so, ascending stage by stage, he reaches the top. The descent is, of course, accomplished in the same way.

Some of the Cornish pumping-engines are very large and powerful. The cylinder of one of the largest is 7 ft. 6 in. in diameter. With the expenditure of one bushel of coal, it can raise 100,000,000 lbs. weight one ft. high; this is called its "duty." It lifts nearly 800 gallons of water per minute, and its cost was about £8,000.

In Cornwall the miners are divided into two classes: one of them called *tributers*, who take a two months' contract of a portion of the lode; the other called *tutmen*, who are employed in sinking shafts, driving levels, etc.

A detailed analysis of one of the largest Cornish copper mines, published some years ago, shows that in that year it produced, in round numbers, 16,000 tons of ore, realizing £90,000, and yielding a net profit of about £16,000. It employed about 700 miners, 300 laborers, 300 boys, and 300 women and girls. The cost for coal was £1800; for malleable iron and steel, £1300; for foundry castings, £2,000; for ropes, £1000; for candles, £1800; for gunpowder, £2,000; and for timber, nearly £3,000. The last mines regulation acts were passed in 1872 (amended in 1875). See MINES IN LAW.

Mining for Coal.—The minerals of the carboniferous formation, at least those which occur in beds or strata, as coal and clay ironstone, are mined, as has been already said, in a different way from metallic veins. Originally deposited in a horizontal position, they have been so altered by movements in the earth's crust, that they are rarely found so now. They are more generally found lying in a kind of basin or trough, with many minor undulations and dislocations. But however much twisted out of their original position, the different seams, more or less, preserve their parallelism, a fact of great service to the miner, since beds of shale, or other minerals, of a known distance from a coal seam, are often exposed when the coal itself is not, and so indicate where it may be found.

The great progress made of late years in the science of geology has made us so minutely acquainted with all the rock formations above and below the coal measures, that it is now a comparatively easy matter to determine whether, in any given spot, coal may or may not be found. Nevertheless, large sums are still occasionally, as they have in past times been very frequently, wasted in the fruitless search for coal, where the character of the rocks indicates formations far removed from coal-bearing strata.

When there are good grounds for supposing that coal is likely to be found in any particular locality, before a pit is sunk the preliminary process of "boring" (q.v.) is resorted to, in order to determine whether it actually does exist there, and if in quantity sufficient to make the mining of it profitable. The usual mode of "winning" or reaching the coal is to sink a perpendicular shaft; but sometimes a level or cross-cut mine, and at other times an inclined plane or "dook," is adopted. Before the introduction of

pumping-engines, all coal-workings were drained by means of a level mine called a *day-level*, driven from the lowest available point on the surface, and no coal could be wrought at a lower depth than this, because there were no means of removing the water.

When the shaft has been sunk to the necessary depth, a level passage, called the *dip-head*, or *main-level*, is first driven on each side, which acts as a roadway or passage, and, at the same time, as a drain to conduct the water, which accumulates in the workings, by means of a gutter on one side, to the lodgment at the bottom of the shaft. This level is the lowest limit of the workings in the direction of the dip, and from it the coal is worked out as far as is practicable along the rise of the strata. There are two principal methods of mining the coal. One is termed the "post-and-stall" or "stoop-and-room" system, and is used for thick seams; the other is called the "long-wall" system, and is adopted for seams under 4 ft. in thickness. In a mine wrought on the post-and-stall plan, the coal is taken out in parallel spaces of say 15 ft. wide, intersected by a similar series of passages at right angles. Between these "rooms," as they are called, "stoops" of coal, about 30 ft. each way, are left for the support of the "roof" of the seam. Larger stoops are left at the bottom of the shaft, in order to secure greater stability there. There is a modification of this plan adopted at Newcastle, called the "board-and-pillar" method, by which a certain number of the stoops or pillars are removed altogether, after which the roof falls in, and forms a mass of ruins, termed a "goaf."

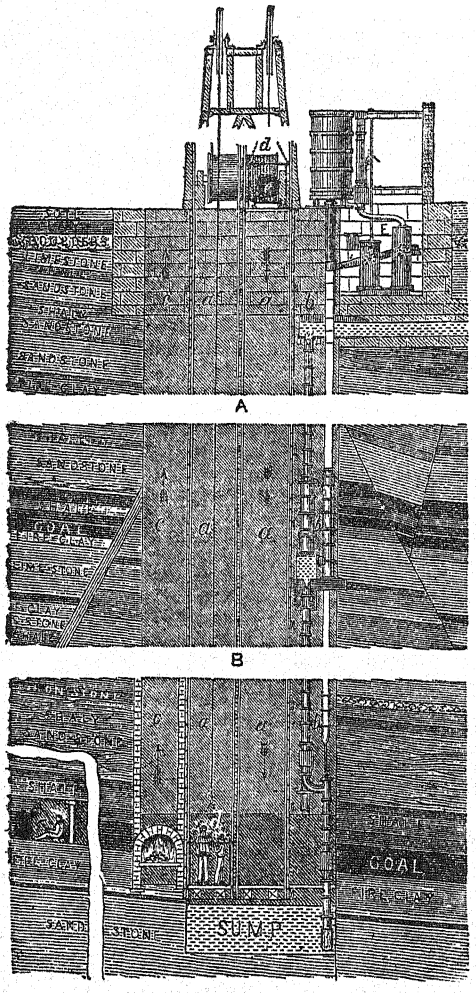


Fig. 2.—Vertical Section of the Shaft of a Coal-pit, with a Detached Portion, showing a Miner at work on the Coal Seam.

The *long-wall* system consists in extracting the entire seam of coal at the first working, the overlying strata being supported by the waste rock from the roof of the workings. It is necessary, however, to leave large stoops at the bottom of the shaft for its support, as in the stoop-and-room method. In long-wall workings, roads of a proper height and width require to be made for communication with the different parts of the mine.

The collier's usual mode of extracting the coal from its bed is this: With a light pick, he undercuts the coal-seam, technically termed "holing," for 2 or 3 ft. inwards, and then, by driving in wedges at the top of the seam, he breaks away the portion which has been holed. Blasting is occasionally, but not often resorted to. For the past ten years, machines, some for "holing" only, and others for both "holing" and hewing down coal-seams, have been more or less in use. They usually work with compressed air, but sometimes with steam or water. It is still premature, however, to express any decided opinion as to their efficiency as compared with hand-labor. The coal, when separated from its bed, is put on tubs or hutches, which are generally drawn by horses, but sometimes by engine-power, along the roads to the bottom of the shaft, and hoisted to the surface.

The shaft is perhaps the most important portion of a coal-pit, and the principal parts of one are shown in fig. 2. The upper part shows the pit-head arrangements, the central part shows the force-pump, etc., and the lower part shows the pit-bottom arrangements. To make the section complete, the reader must imagine a great depth to intervene at the gaps A and B. There are four divisions in this shaft: the two center ones, *a*, *a*, are used for sending up and down the men and the coal; the one on the right side, *b*.

contains the pump; and the remaining one on the left, *c*, is for withdrawing the vitiated air from the mine, and has usually a furnace at the bottom of it. In some pits a special shaft is applied to the ventilation, for which mechanical contrivances, such as ventilating fans, are now also partially introduced. Since the dreadful accident at the Hartley Colliery, in January, 1862, caused by the beam of the engine breaking and closing up the shaft, an act of parliament has been passed making it imperative to have two shafts, or at least two outlets, to every coal-mine, as a means of escape, in case of an accident to one of them.

The cages *d*, *d*, by which the colliers ascend and descend, are also used for raising the coal. They are merely square plats of timber, with rails across thom, for the convenience of running off and on the coal-hutches, *e*, and with a light iron frame, by which they are suspended to a flat wire-rope. On each cage there are iron clasps, which slide up and down on guide-rods. In the figure, two miners are shown standing on one cage at the bottom of the shaft, and the other is at the top, with a coal-hutch upon it. The accidents resulting from the raising and lowering of the cages are numerous; many of them happen by the carelessness of the engine-man in not stopping the cage when it reaches the mouth of the pit, and so allowing it to be upset by over-winding. Many accidents also happen from the rope breaking. To prevent this, numerous "safety-cages" have been invented, most of which depend on the action of a spring, which is held in a certain position while the cage is suspended by the rope; but should the latter snap, the spring is suddenly relieved, and then grasping the guide-rods, prevents the cage from falling. Other safety cages act by levers and clutches, but it is still disputed whether there is, on the whole, a decided advantage in using any of them, since they are all liable to get out of order. The man-engine, although not used in British collieries, is adopted in several on the continent, and is certainly the safest way of putting up and down men in a pit.

The steam-engine, E, works the pumps, in this case by a direct action, the pump-rods being attached to the piston-rod. The engine also winds up the cages, one of which ascends while the other descends—the barrel and other arrangements for which are shown in the figure.

The proper ventilation of any mine, but especially of a coal mine, is of very great importance. It clears the mine of the dangerous gases, fire-damp and foul-damp, dries the subterranean roadways, and furnishes the miners with a supply of pure air. Some idea of the general mode of ventilating a mine will be obtained by referring to Fig. 2, where the arrows pointing downward indicate the *downcast* shaft, and the arrows pointing upward, the *upcast* one. A number of doors and stops secure the traveling of the current in a proper direction, so as to reach the furthest recesses of the mine. It then returns by the upcast shaft, where, as has been already stated, it is usual to keep a furnace burning, to aid in withdrawing the impure air. It is very difficult, however, to secure efficient ventilation through all the zigzag windings of a mine; hence the frequent and sometimes terrible explosions of fire-damp, or light carbureted hydrogen, which explodes when mixed with a certain proportion of atmospheric air; hence, also, the occasional accumulation of foul-damp (carbonic acid) in some pits, which suffocates any one breathing it. This deadly gas is always produced in large quantity by an explosion of fire-damp, and chokes many who have survived the violence of the explosion. Many collieries are so free of fire-damp, that the miners work with naked lights, but in others it is necessary to use the safety lamp (q.v.).

Besides the already mentioned sources of accident, there is the sudden falling-in of pieces from the roof of the workings. The following summary, made up from H. M. inspector's returns, shows the number of lives lost, in proportion to the quantity of coal raised:

Total tons of mineral raised in Great Britain for the year 1876	148,989,385
Total number of lives lost in 1876	933
Average tons of mineral raised to each life lost	159,688

To show the magnitude of some of the large coal-mines, it may be stated that the Hetton colliery, in Durham, yields 800,000 tons in the year, employs about 1000 men and 300 boys underground, and 300 people at the surface. The Monkwearmouth pit, near Newcastle, is 1900 ft. deep, and its face-workings are 2 m. from the bottom of the shaft. Rosebridge colliery, near Wigan, has the deepest shaft in England, being nearly 2,500 ft. deep. The sinking of some of the more difficult shafts has cost from £50,000 to £100,000 each.

MINING. See APPENDIX.

MINING CORPORATIONS, companies incorporated under national, state, or colonial law, to mine for the precious metals or other minerals. Such companies are sometimes permitted also to manufacture, or to do a milling or reduction business, in connection with mining; or to engage in transportation—as of coal from the mine to the market. Mining property is held by purchase and absolute ownership, or by lease. In the Dominion of Canada leases are granted by the queen, and a royalty on the yield paid to the government. The number of mining companies in the United States in good standing, reported on Jan. 1, 1881, was 212, divided as follows as to the location of the mines: California 37, Colorado 80, Montana 4, Dakotah 11, North Carolina 5, Nevada 31, Ari-

zona 15, Maryland 1, Utah 11, New York 1, Georgia 3, Michigan 5, Mexico 2, Arkansas 2, New Mexico 1, Virginia 3. These mining properties were capitalized in the sum of $931,000,000. As an illustration of the extent to which mines were over-capitalized, it may be mentioned that the market-value of the properties of 95 of these mines capitalized in $745,000,000, estimated on the selling prices of the various stocks, was (in round numbers) $60,000,000, or eight per cent of the capital; amounting to the fact that the stocks in question were at the time when the figures were procured selling on the mining-stock exchange of New York city at the discount of 92 per cent.

MINISTER, a public functionary who has the chief direction of any department in a state. See MINISTRY. Also the delegate or representative of a sovereign at a foreign court to treat of affairs of state. Every independent state has a right to send public ministers to, and receive them from, any other sovereign state with which it desires to preserve relations of amity. Semi-sovereign states have generally been considered not to possess the *jus legationis*, unless when delegated to them by the state on which they are dependent. The right of confederated states to send public ministers to each other, or to foreign states, depends on the nature and constitution of the union by which they are bound together. The constitution of the United Provinces of the Low Countries and of the old German empire preserved this right to the individual states or princes, as do the present constitutions of the German empire and Swiss confederation. The constitution of the United States either greatly modifies or entirely takes away the *jus legationis* of each individual state. Every sovereign state has a right to receive public ministers from other powers, unless where obligations to the contrary have been entered into by treaty. The diplomatic usage of Europe recognizes three orders of ministers. Ministers of the first order possess the representative character in the highest degree, representing the state or sovereign sending them not only in the particular affairs with which they are charged, but in other matters: they may claim the same honors as would belong to their constituent, if present. This first class of diplomatic agents includes papal legates and nuncios, and ambassadors ordinary and extraordinary. A principle of reciprocity is recognized in the class of diplomatic agents sent. States enjoying the honors of royalty send to each other ministers of the first class; so also in some cases do those states which do not enjoy them; but it is said that no state enjoying such honors can receive ministers of the first class from those who are not possessed of them.

Ministers of the second and third order have not the same strictly representative character; their representation is not held to go beyond the affairs with which they are charged. They are, however, the natural protectors of the subjects of the state or country sending them in the country to which they are sent. Ministers of the second class include envoys, whether these are simply so styled, or denominated envoys extraordinary, and also ministers plenipotentiary. The third class of ministers does not differ from the second in the degree of their representative character, but only in the diversity of their dignity, and the ceremonial with which they are received. This class comprehends ministers, ministers resident, ministers chargés d'affaires, such consuls as are possessed of a diplomatic character, and those chargés d'affaires who are sent to courts to which it is not wished to send agents with the title of minister. Ministers of the third class have, for the most part, no letters-credential from the sovereign, and are accredited only by letters to the foreign minister or secretary of the country to which they are sent.

Besides these orders of ministers, there are other diplomatic agents occasionally recognized—as deputies sent to a congress or confederacy of states, and commissioners sent to settle territorial limits or disputes concerning jurisdiction. These are generally considered to enjoy the privileges of ministers of the second and third order. Ministers-mediators are ministers sent by two powers, between which a dispute has arisen, to a foreign court, or congress, where a third power, or several powers, have, with the consent of the two powers at variance, offered to mediate between them.

Diplomatic agents, except, as already mentioned, those of the third class, are accredited by a letter to the sovereign of the country to which they are sent. The letter of credence is usually dispatched under a *cachet volant*—i.e., a seal which does not close the letter; or else, in addition to the principal letter, an authenticated copy is sent, which the diplomatic agent on his arrival presents to the minister or secretary for foreign affairs, as his right to demand an audience of the sovereign; the original is presented to the sovereign. Ministers sent to a congress or diet have usually no credentials, but merely a full power, of which an authenticated copy is delivered into the hands of a directing minister, or minister-mediator. A minister of the first class is received to both public and private audiences by the sovereign to whom he is accredited; a minister of the second class generally to private audiences only. Diplomatic agents are entitled to conduct negotiations either directly with the sovereign, or with the minister or secretary for foreign affairs. The latter course is the more usual, and generally the more convenient.

The title "excellency" has since the peace of Westphalia been accorded to all diplomatic agents of the first class; and in some courts it is extended to ministers of the second class, or at least those sent by the great powers. See AMBASSADOR, ENVOY, CONSUL. Under AMBASSADOR the immunities and privileges enjoyed by diplomatic agents are explained.

MINISTER, CHRISTIAN. See CLERGY, *ante*.

MINISTER,—MINISTRY (*ante*). I. FUNCTIONARY DIPLOMATIC. By the American system ministers to exercise diplomatic functions near foreign courts are appointed by the president and confirmed by the senate of the United States. They are accredited by letter to the sovereign of the country to which they are appointed, and are permitted certain immunities and privileges: being entitled to be addressed as "excellency," and conceded exemption from the operation of municipal law. The United States send no envoys of the rank of ambassadors, permanently accredited to foreign courts; but have not infrequently conferred the rank and authority in the case of special missions. See AMBASSADOR, *ante*. II. FUNCTIONARY EXECUTIVE. In the United States government the executive offices are under the immediate official direction and control of the heads of the departments, including those of state, treasury, interior, war, post-office, navy, justice, and agriculture. Seven of these officials have seats in the cabinet or council of advisers of the president, and are termed "the cabinet." They are the secretaries of state, war, the treasury, the navy, and the interior; the postmaster-general, and the attorney-general, or head of the department of justice. These officials are appointed by the president and confirmed by the senate; their duty is to administer or execute the functions of their respective offices under the direction of the president, to whom they are immediately responsible and to whom they report annually; and from time to time on special subjects if so desired by him. They hold their offices at the will of the president, who may request their resignations if the good of the public service shall seem to require it. As an advisory council, they assemble at the call of the president, or at stated times, for conference, to enunciate opinions or to answer questions. There is nothing, however, in the constitution or elsewhere in American law which renders it obligatory on the president to employ them in this manner, though custom has made it usual and convenient so to do. Excepting to the president for the proper performance of their official duties, they have no responsibilities; and in no particular except in the nature of these duties do they resemble the ministers of Great Britain or those of the European powers. See CABINET, *ante*.

MINISTRY, the body of ministers of state, or persons to whom the sovereign or chief magistrate of a country commits the executive government.

It is a principle of the constitution of Great Britain, that "the king can do no wrong;" that is to say, the sovereign personally is irresponsible for his acts, the real responsibility resting with the administrative government. The "king's council," or PRIVY COUNCIL, were the earliest advisers of the sovereign in matters of state; but when this body came, in the course of time, to be found too large for the dispatch of business, its duties were transferred to a small committee of privy councilors selected by the king. As late as in Charles I.'s time, all the more important resolutions of the crown were taken after deliberation and assent of the privy council. An unsuccessful attempt was made in the reign of Charles II. to restore the council to its original functions. Its numbers were limited to thirty; and it was intended that this limited council should have the control of the whole executive administration, superseding any interior cabinet. But the council was found too extensive for an effectively working ministry, and the former arrangment was restored. The CABINET or MINISTRY is now but a committee of the privy council; and its exclusive right to discuss and determine the plans and business of the government has been often said not to be recognized by the law, a position which, however, was disputed by lord Campbell, who maintained that, "by our constitution, it is in practice a defined and acknowledged body for carrying on the executive government of the country." Proclamations and orders still issue from the privy council; and it is occasionally assembled to deliberate on public affairs, when only those councilors who are summoned attend. The cabinet is a merely deliberative body; its members collectively have no power to issue warrants or proclamations; but all important measures which engage the attention of the government, whether regarding matters domestic, foreign, or colonial, and all plans of action, whether purely administrative, or to be carried out in parliament, must be proposed, considered, and adopted by the cabinet. The sovereign intrusts the formation of a ministry to a statesman, who selects for the members of his cabinet those who are attached to his political views. He generally places himself at the head of the government as first lord of the treasury, and in popular language, he is called the premier, or prime minister. The lord chancellor, the chancellor of the exchequer, the secretaries of state for home, foreign, colonial, and Indian affairs, the secretary at war, and the president of the council, are necessarily members of the cabinet; and with them are associated the heads of various other important departments of government, including generally the first lord of the admiralty, the president of the board of trade, the postmaster-general, the president of the poor-law board, the chancellor of the duchy of Lancaster, and occasionally the chief secretary for Ireland. The premier has sometimes held the office of chancellor of the exchequer in conjunction with that of first lord of the treasury. A privy councilor of great political weight is sometimes called into the cabinet without office, and takes the post of lord privy seal. Her majesty's ministers include the following, who have usually no seat in the cabinet: the chief secretary for Ireland, the first commissioner of works, the vice-president of the board of trade, the vice-president ot the committee on education, the commander-in-chief, the lord chamberlain, the steward, the master of the horse, the

master of the buckhounds, the comptroller of the household, the lord lieutenant of Ireland, the attorney-general and solicitor-general of England, the lord advocate and solicitor-general of Scotland, and the attorney-general and solicitor-general of Ireland. Occasionally, but exceptionally, the commander-in-chief, and the lord chief justice of England, have been members of the cabinet. A ministry is often spoken of as the ministry of the person who is at its head.

Meetings of the cabinet are held on the summons of any one of its members, usually at the foreign office. Its proceedings are secret and confidential, and no record is kept of its resolutions, which are carried into effect by those of its members to whose departments they severally belong. As the acts of a ministry are at all times liable to be called in question in parliament, it is necessary that the heads of the chief departments should have seats in either house, in order to be able, when required, to give prompt explanations.

A government exists only so long as it can command the confidence of parliament. The sovereign has the power to dismiss his ministers whenever they cease to possess his confidence, but such a change would be useless without the support of the house of commons, who, by withholding their support, could paralyze all the functions of government. A sovereign has sometimes got rid of a ministry with whose policy he was dissatisfied, by dissolving parliament, and appealing to the country. When a ministry cannot command the confidence of parliament, they resign, and a statesman of some other political party is sent for by the sovereign, and authorized to form a new cabinet. All the adherents of a ministry filling political offices resign along with it, as also the great officers of the court, and those officers of the royal household who have seats in either house of parliament. Sometimes officers holding lucrative appointments which do not necessitate resignation, have retired, as a manifestation of adherence to their political friends. In addition to the ministers already named, the following adherents of the ministry go out of office on a change of government: the three junior lords of the treasury, the two secretaries of the treasury, the four parliamentary under-secretaries of state, the paymaster-general, the master-general of the ordnance, the surveyor-general of the ordnance, the five junior lords of the admiralty, the first secretary of the admiralty, the chief commissioner of Greenwich hospital, the president and parliamentary secretary of the poor-law board, the president of the board of health, the vice-chamberlain, the captain of the gentlemen-at-arms, the captain of the yeomen of the guard, the lords in waiting, the mistress of the robes, the treasurer of the household, the chief equerry, or clerk marshal, the judge advocate-general, and the lord chancellor for Ireland. The private secretary to a minister loses office on a change, his appointment being a purely personal one; and some changes are generally, though not always made in ambassadors extraordinary.

In 1839, when viscount Melbourne's ministry resigned, sir Robert Peel, who was intrusted by the queen with the formation of a new ministry, proposed that, in order to give public proof of her majesty's confidence, the change should include the chief appointments held by the ladies of her majesty's household. The queen, counseled by lord Melbourne, refused her consent to this proposal, on the ground of its being contrary to the latest precedents of the reign of queen Anne. Sir Robert, however (with whose opinion the duke of Wellington expressed concurrence), considered the change a necessary one; and as he refused to undertake the formation of a government without its being adopted, the result was that lord Melbourne and his colleagues were reinstated. At a council held on their resuming office, it was resolved "That for the purpose of giving to the administration the character of efficiency and stability, and those marks of the constitutional support of the crown that are requisite to enable it to act usefully to the public service, it is reasonable that the great offices of the court, and situations in the household held by members of parliament, should be included in the political arrangements made in a change of the administration. But they are not of opinion that a similar principle should be applied or extended to the offices held by ladies in her majesty's household."

MIN'IUM (Lat. red-lead). See LEAD.

MINK, *Mustela lutreola*, a species of weasel inhabiting the northern parts of Europe and Asia; very similar to which in characters and habits is another species, by some regarded as only a variety of the same, the mink or VISON (*M. vison*) of North America, abundant in almost every part of that continent. Both inhabit the neighborhood of streams, lakes, and marshes; have semi-palmated feet, are expert swimmers and divers, and prey on fishes, frogs, and other aquatic animals, as well as on birds, rats, mice, etc. They are covered with a downy fur, interspersed with longer and stronger hairs: the color is brown, with more or less of white on the under parts. The American mink is generally larger than that of the old world, being often more than 18 in. from the nose to the root of the tail, whilst the latter is seldom more than 12. It has also a more bushy tail. It is very active and bold, and often commits great depredations in poultry-yards, carrying off a fowl with great ease. Unlike most of its congeners, it is easily tamed, and becomes much attached to those who caress it. In domestication it ceases to regard the inmates of the poultry-yard as prey. It emits an unpleasant odor only when irritated or alarmed. The fur of the mink is valuable. See WEASEL.

MINNEAPOLIS, a city in s.e. Minnesota, incorporated 1867; enlarged by the annexation of the city of St. Anthony, 1872; situated at the falls of St. Anthony, 10 m. w. of St. Paul; pop. '80, 46,887. It is built on a broad plateau, through which flows the Mississippi river, overlooked by bold bluffs, which command a view of the surrounding country, noted for its picturesque scenery. At the falls of St. Anthony the river makes a descent of 50 ft. within a mile (80 ft. within the limits of the city), and has a perpendicular descent of 18 feet. It is crossed by 4 bridges, including a suspension bridge built in 1876; and in the vicinity are lakes Cedar, Calhoun, and Harriet. It is supplied by means of the river with extensive water-power, which is utilized by immense manufactories and mills. The value of the lumber sawed in one year was $2,948,335; that of flour made in one year was $7,320,410. It has grocers who do a business of from $4,000,000 to $5,000,000 a year; and large dry-goods and commercial houses. There was expended in the city, for building and improvements, in one year, $1,729,700. The leading industries are lumber and flour, and among its flour-mills is one with 40 run of stone—the largest in the country. An immense amount of grain is milled; other industries are the manufacture of iron machinery, engines and boilers, water-wheels, agricultural implements, sashes, doors, and blinds, beer, cotton and woolen goods, furniture, barrels, boots and shoes, paper, linseed-oil, etc. It has pork-packing establishments, and a large number of saw-mills. It has been a city of rapid growth, and has an important wholesale trade, which is constantly increasing. It is on the Chicago, Milwaukee and St. Paul railroad, at the junction of the St. Paul and Pacific and the Lake Superior and Mississippi with the Minneapolis and St. Louis line, all of which roads transport a large amount of freight, which is increasing yearly. It has a line of steamers to St. Cloud. It is regularly laid out, with avenues 80 ft. wide, crossed by streets at right angles, which are shaded by two rows of trees; is lighted by gas; is well sewered; and has a public park. It has 10 wards, a mayor, and board of aldermen of two members from each ward, a police force, and a fire department. There are 11 banks—6 national, with an aggregate capital of $1,025,000. Among public buildings are a court-house, a city hall erected in 1873, an academy of music, and an opera-house. There are 65 churches. The athenæum has a library of 8,000 vols. Minneapolis is the seat of the university of Minnesota (non-sectarian, and open to both sexes), organized in 1868, and having a library of 10,000 vols.; and the Augsburg theological seminary (Lutheran), established by the Scandinavians of the n.w., with a library of 1100 vols.; also Hamline university (Methodist). It has 14 newspapers—2 Norwegian, 1 German; and 2 semi-monthly periodicals, 1 Norwegian. The falls of Minnehaha (laughing water) are 3 m. distant.

MINNEHAHA, a river and fall in s.e. Minnesota, near the station of Minnehaha on the St. Paul and Pacific railroad, one-half mile from the Mississippi river and a short distance from Minneapolis. Considerable interest attaches to this cascade, it being the scene of a legendary romance wrought into the story of Longfellow's poem of *Hiawatha*. The river Minnehaha flows over a limestone cliff, making a sudden descent of 60 ft., and the story runs that Minnehaha, an Indian maiden crossed in love, here took the fatal leap. Minnehaha, in Dakota language, signifies laughing water.

MINNEHAHA, a co. in s.e. Dakota, having the state-line of Minnesota for its e. boundary; drained by the Big Sioux river and small affluents; 800 sq.m.; pop. '80 8,252—5,502 of American birth, 48 colored. It has Beaver lake and other small lakes in the n.w. Its surface is generally rich level prairies with little timber, but very productive where under cultivation. It is intersected by the Sioux City and St. Paul railroad, and its county seat contains a U. S. land office. Capital, Sioux Falls.

MINNESINGERS, a designation applied to the earliest lyric poets of Germany in the 12th and 13th centuries, and derived from the word *minne*, or love, which was at first the predominating, and almost sole subject treated of in their productions. The works of the minnesingers are for the most part superior to those of their more generally known contemporaries, the troubadours, both in regard to delicacy of sentiment, elegance and variety of rhythmical structure, and grace of diction. Henry of Veldig, who flourished in the beginning of the 12th c. at the court of the Swabian, Frederick Barbarossa, emperor of Germany, is regarded as the father of the minnesingers, and Walther von der Weide, who was born about 1170, as the last of this great vocal band, which included emperors, princes, nobles, and knights. Many of their productions have of course perished, although, in addition to a very large collection of poems by anonymous minnesingers, we still possess some remains of the songs of more than 150 known composers. Among the most celebrated of these, special notice is due to Wolfram von Eschenbach (q.v.), Henry von Ofterdingen, Hagenaue, Hartmann von der Aue (q.v.), Gottfried von Strasburg (q.v.), Otto von Botenlauben, Truchsess von St. Gall, and Ulrich von Lichtenstein—men of noble houses, who, although they belonged to every part of Germany, wrote almost exclusively in the Swabian dialect, which, during the brilliant days of the Fredericks and Conrads of the house of Swabia, was the language of the court in Germany. Among the few other forms of German employed by the minnesingers, the one next in favor was the Thuringian, adopted in compliment to Hermann, landgraf of Thuringia, who, next to the princes of the Swabian dynasty, was the most munificent patron of the minnesingers during the period of their renown, in the early part of the 13th century. Besides songs in praise of women, the minnesingers composed odes on public or private

occasions of lament or joy, distiches or axioms, and *wachtlieder*, or watch-songs, in which the lover was represented as expostulating with the watchman, who kept guard at the gate of the castle within which his lady-love was imprisoned and trying to persuade him to grant him admittance to her presence. These songs and odes were recited by the composer, to his own accompaniment on the viol; and as few of the minnesingers could write, their compositions were preserved mostly by verbal tradition only, and carried by wandering minstrels from castle to castle throughout Germany, and even beyond its borders. As the variety of rhythm and complicated forms of versification affected by the minnesingers, more especially towards the decline of their art, rendered it difficult to retain by memory the mass of minnesong which had been gradually accumulated, these itinerant musicians finally made use of written collections, a practice to which alone we are indebted for the many beautiful specimens of early German lyrical poetry which we yet possess. The glory of the minnesingers may be said to have perished with the downfall of the Swabian dynasty, under which greater liberty of thought and word was allowed among Germans than they again enjoyed for many ages; and in proportion as the church succeeded in reasserting its sway over the minds of men, which it had lost under the rule of the chivalric Fredericks, freedom of speech and action was trammeled, and song and poetry contemned. Paraphrases of Scripture, hymns, and monkish legends, took the place of the chivalric songs of the nobly born minnesingers, and German poetry was for a time almost annihilated.

In the 14th c., the art of minnesong was partially revived, although under a rude and clumsily elaborated form, by the *master-singers*, a body of men belonging to the burgher and peasant classes, who, in accordance with their artisan habits, formed themselves into guilds or companies, which bound themselves to observe certain arbitrary laws of rhythm. Nuremberg was the focus of their guilds, which rapidly spread over the whole of Germany, and gained so firm a footing in the land, that the last of them was not dissolved at Ulm till 1839. As the title of master was only awarded to a member who invented a new form of verse, and the companies consisted almost exclusively of uneducated persons of the working-classes, it may easily be conceived that extravagances and absurdities of every kind speedily formed a leading characteristic of their modes of versification; attention to quantity was, moreover, not deemed necessary, regard being had merely to the number of the syllables, and the relative position and order of the verses and rhymes. Their songs were lyrical, and sung to music; and although, as before remarked, each master was bound to devise a special *stole* or order of rhymes for each of his compositions, these stoles were subjected to a severe code of criticism, enacted by the *tabulatur*, or rules of the song-schools. Among the few masters who exhibited any genuine poetic feeling, the most noted were Heinrich Mügeln, Michael Behaim, and the Nuremberg shoemaker, Hans Sachs, who prided himself on having composed 4,275 *bar* or master songs. See Tieck's *Minnelieder* (1803); Taylor's *Lays of the Minne and Master Singers* (Lond. 1825); and Von der Hagen's *Minnesänger* (4 vols. 1838).

END OF VOL. IX.